CITY OF LODI

COUNCIL COMMUNICATION

AGENDA TITLE: Set a Public Hearing for July 18, 2001, to Consider Adopting the Update of Lodi's Urban Water Management Plan

MEETING DATE: June 20, 2001

PREPARED BY: Public Works Director

RECOMMENDED ACTION: That the City Council set a public hearing for July 18, 2001, to consider adopting the update of Lodi's Urban Water Management Plan.

BACKGROUND INFORMATION: During the 1983/84 Regular Session, the California Legislature enacted Assembly Bill 797, and as subsequently amended, created Water Code Section 10610, et seq., known as the Urban Water Management Planning Act. This Act requires the City of Lodi to review and update the Urban Water Management Plan every five years. The current update was performed with the assistance of Brown and Caldwell, consulting engineers, and is the third update of Lodi's Urban Water Management Plan. The adoption process requires a public hearing and adoption by the City Council. Staff will seek additional policy direction following the hearing.

The Plan updates Lodi's historical and projected population and water use, water rates, and water metering program status. There are substantive changes from the previous plan. Much more attention is given to the groundwater overdraft problem and to conservation measures, including metering.

A copy of the updated Urban Water Management Plan (approximately 75 pages) is available for review by the public in the Public Works Department, the City Clerk's Office, and the Lodi Library.

FUNDING: None required.

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CITY OF LODI
CALIFORNIA

June 20[illegible]

Urban Water Management Plan

BROWN AND CALDWELL

CITY OF LODI

URBAN WATER MANAGEMENT PLAN

In Memory of ORSON LAAM JR.

Pictured on the cover is the recently completed low water demand landscaping (xeriscape) project at Lodi Municipal Well No. 11R, 824 East Turner Road. This xeriscape project is dedicated to the Lodi's first Water Conservation Coordinator Orson Laam, Jr., who passed away unexpectedly on Friday, May 19, 2000 at the age of 58 following a lengthy battle with cancer. On April 18, 1990 Orson was hired as a Deputy Water Conservation Officer. In 1991 he was promoted to the Water Conservation Officer eventually handling both the enforcement and in-school education programs. In January 1998 Orson Laam became Lodi's first full-time Water Conservation Coordinator. Orson's favorite aspect of his job was visiting Lodi grade schools, teaching water science and conservation to children. (From 1996 – 1998 he averaged over 250 school presentations per year.) He dealt fairly with the public and was pleasant and caring co-worker. A former professional radio DJ, Orson always had a big smile and warm hello for everyone he came in contact with. We will deeply miss our friend, co-worker and dedicated water conservation educator.

CITY OF LODI

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BROWN AND CALDWELL

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LODI
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EXECUTIVE SUMMARY

This Plan is the year 2000 Urban Water Management Plan as required by the Urban Water Management Planning Act and it serves as the long-term water supply plan for the City of Lodi (City). The purpose of this Plan is to ensure the efficient use of available water supplies, describe and evaluate the existing water system and historical and projected water use, and evaluate current and projected water supply reliability as required by the Urban Water Management Act (Act).

Description of Existing Water System

The City of Lodi Water Utility is the only water purveyor in the City and serves approximately 16,753 connections. Lodi is located in the northern San Joaquin Valley bordered to the north by the Mokelumne River. Groundwater from 24 active wells with a combined capacity of 34,225 gallons per minute (gpm) is the sole source of water supply for the City of Lodi. The City's distribution system consists of one pressure zone, two storage facilities, a pumping station, and the piping system.

Historical and Projected Water Use

The year 2000 population in Lodi is 57,935 people and is expected to reach 86,088 in 2020. Water demands through the year 2020 are estimated based on a 2.0 percent annual water demand growth rate estimated by the City of Lodi's Public Works Department. Table ES-1 presents the projected water demands through year 2020.

Table ES-1. Total Projected Water Demands

	Annual average		Maximum day
Year	ac-ft/yr[a]	mgd	mgd
2000	16,874	15.1	30.1
2005	18,630	16.6	33.3
2010	20,569	18.4	36.7
2015	22,710	20.3	40.5
2020	25,074	22.4	44.8

[a] acre-feet/year

Water Supply Quantity

Groundwater is currently the sole source of water for the City. From 1990 through 1999, groundwater use averaged 14,787 ac-ft/yr. The groundwater basin is considered to be over drafted. The City will have to take steps to reduce overall groundwater pumping by itself and/or others. For the purpose of this study, it is estimated that the available sustainable groundwater supply is approximately equal to 1980 pumping, or 12,000 ac-ft/yr. This assumption regarding sustainable groundwater supply is only an approximation since the safe yield of the groundwater basin underlying the City has not been defined. Given this assumption, the City does not have a sustainable water supply for preventing over draft through the year 2020. Given current practices, however, the City will still be able to pump sufficient groundwater during this over drafting period.

A water supply reliability comparison is made in Table ES-2 for the year 2020, considering three water supply scenarios: an average/normal water year; single dry water year; and multiple dry water years. As shown in Table ES-2, the water supply would be overdrafting during multiple dry years.

Table ES-2. Water Supply Reliability, 2020, ac-ft/yr

	Average/normal water year	Single dry water year	Multiple dry water years		
			Year 1	Year 2	Year 3
Sustainable water supply					
Surface water	0	0	0	0	0
Groundwater[a]	12,000	12,000	12,000	12,000	12,000
Recycled water	0	0	0	0	0
Total	12,000	12,000	12,000	12,000	12,000
2020 Demand	25,074	25,074	25,074	25,074	25,074
Surplus or (Deficit)	-10,727	-10,727	-10,727	-10,727	-10,727

Units of measure: ac-ft/yr
[a] Based on 1980 pumping rate.

Water Conservation Best Management Practices

The results of an economic analysis conducted on several of the water conservation Best Management Practices (BMPs) shows that all analyzed BMPs are not economical to implement except for BMP 5 (Large Landscapes Conservation Programs and Incentives), and BMP 4 (Metering of Residential Customers).

Recycled Water

At this time, the use of recycled water is not a viable option at this time to reduce the total water demand in the City's water service area because it is a significant distance from the source of recycled water at the White Slough Water Pollution Control Facility. The estimated $7.8 million cost of installing pumping facilities and a pipeline to convey recycled water to the service area from the wastewater treatment plant is considered to be expensive at this time compared to the cost of available groundwater. The recycled water use of approximately 4,500 acre-feet per year surrounding the treatment plant, however, does decrease the amount of regional groundwater pumping in the area and can be considered a form of indirect recycling. The City intends to pursue the use of recycled water if it becomes a more economically feasible option.

Recommendations

1. Because the City's groundwater supply is not sustainable to prevent overdraft over the long term, the City should continue participation in the Northeastern San Joaquin County Groundwater Banking Authority towards the development of a conjunctive use program to reduce the overall pumping of groundwater in the area.

2. It does not appear economically feasible at this time to partially meet water demands in the City's water service area through use of recycled water. The estimated $7.8 million cost of installing pumping facilities and a pipeline to convey recycled water to the service area from the wastewater treatment plant is considered to be expensive at this time compared to the cost of available groundwater. The City should reassess this issue in five years and continue

to provide treated water for reuse on lands surrounding the White Slough Water Pollution Control Facility to minimize the amount of groundwater pumping in the region.

3. Continue with current water conservation efforts. Consider implementing the cost effective BMP 5 (Large Landscapes Conservation Programs and Incentives), BMP 9 (CII Conservation), BMP 14 (Residential ULFT), and BMP 4 (Metering of Residential Customers). The City should explore partnering with other utilities and funding opportunities to help implement water conservation BMPs.

4. Track the development of upcoming drinking water standards that may impact the groundwater supply. These standards include arsenic, radon, and the groundwater rule.

5. To maintain groundwater supply capacity, the City should rehabilitate or replace any older wells as they reach the end of their useful lives.

6. Establish a process to record BMP implementation and measure the resulting water savings resulting from BMP implementation.

CHAPTER 1

INTRODUCTION

This Urban Water Management Plan (Plan) addresses the City of Lodi (City) Water Utility (Utility), which provides water to approximately 16,753 connections, serving a population of 57,935 people within the City's boundaries. This Plan is the year 2000 Urban Water Management Plan as required by the Urban Water Management Planning Act (California Water Code Division 6, Part 2.6, Sections 10610 through 10640) and it serves as the long-term water supply plan for the City. The remainder of this chapter provides an overview of the Plan, previous reports, conduct of the study, and public participation.

1.1 Urban Water Management Planning Act

The purpose of this Plan is to ensure the efficient use of available water supplies, describe and evaluate the existing water system and historical and projected water use, and evaluate current and projected water supply reliability as required by the Urban Water Management Act (Act). The Act became part of the California Water Code with the passage of Assembly Bill 797 during the 1983–1984 regular session of the California legislature. The Act requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to adopt and submit an Plan every 5 years to the California Department of Water Resources (DWR). Subsequent assembly bills have amended the Act. The Urban Water Management Plan checklist is presented in Appendix B. This checklist is requested by DWR and is to facilitate review of this plan.

1.2 Previous Reports

The City's Urban Water Management Plan was first developed in 1990, which addressed water supply and demand for the City of Lodi. The 1990 Plan and 1995 Plan update were prepared by the City. The 1995 update included a description of the water system, historical and projected water use, water supply alternatives, recycled water use, water conservation programs, and a water shortage contingency plan.

1.3 Public Participation

The Act requires the encouragement of public participation and a public hearing regarding the Water Management Plan. This hearing provided an opportunity for Lodi's customers/residents and employees in the area to learn about the water supply situation and the plans for providing a reliable, safe, high-quality water supply for the future. The hearing also allowed people to ask questions regarding the current situation and the viability of future plans. This Plan was finalized after the public hearing.

A public hearing was held at a regular meeting of the Lodi City Council. Information regarding the public hearing is included in Appendix G (will be added following the hearing and adoption).

CHAPTER 2

DESCRIPTION OF EXISTING WATER SYSTEM

This chapter describes the City of Lodi Water Utility system (Utility) and includes a description of the service area and climate, the groundwater wells, the reservoirs, and the piping system. The water system's water supply is described in Chapter 4.

2.1 Description of Service Area

The City of Lodi Water Utility is the main water purveyor for the City of Lodi. The City's boundary is the water utility's service area with a few minor connections outside of the City's boundaries. The Utility serves approximately 16,753 connections in the City, which is in the Northern San Joaquin Valley in San Joaquin County and bordered to the north by the Mokelumne River. The Utility service area is essentially the City's boundaries and characterized by a mixture of residential, commercial, and industrial land use. The terrain is essentially flat. Historical and projected population is addressed in detail in Chapter 3.

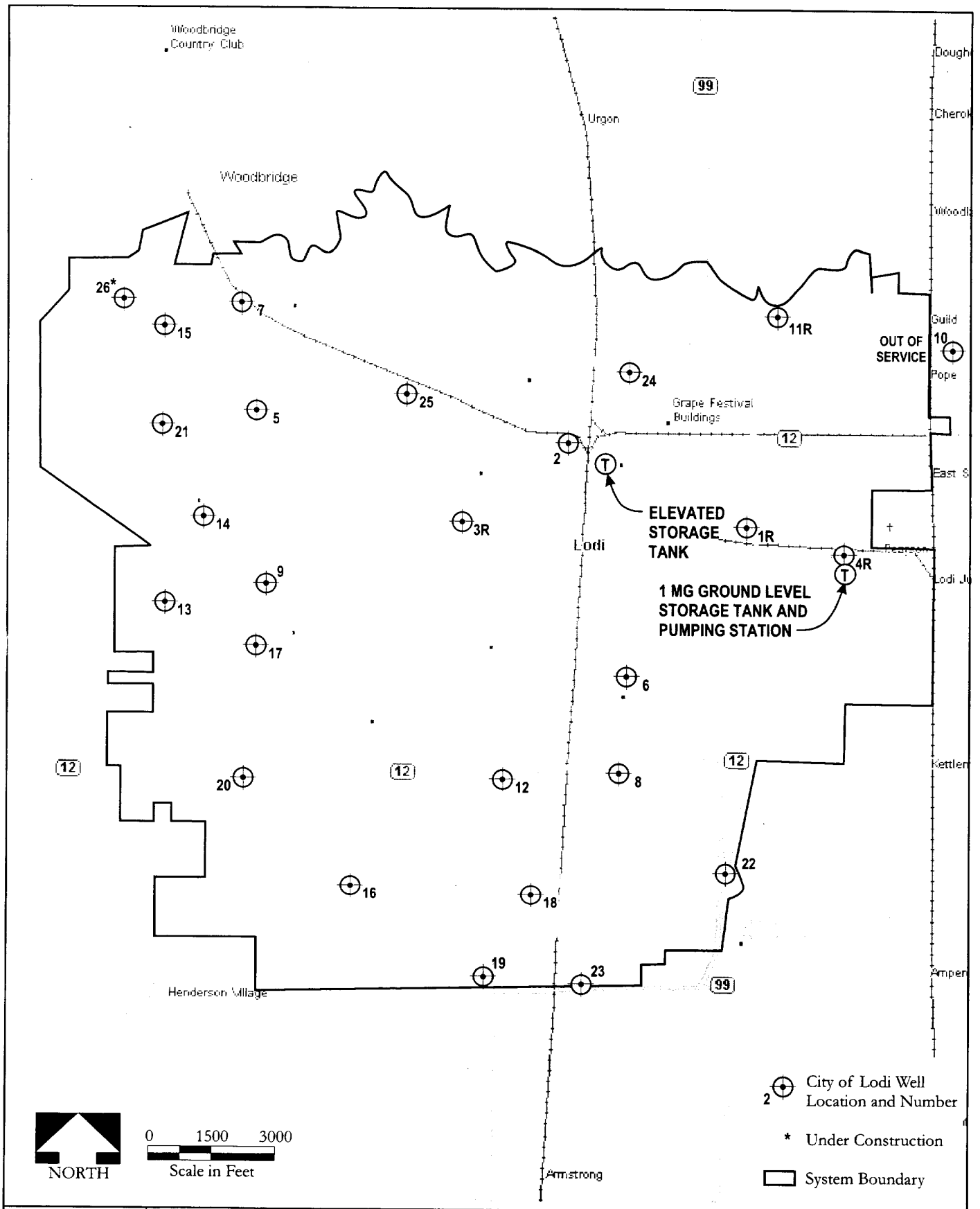
2.2 Climate

The City of Lodi has cool and humid winters, and hot and dry summers. Lodi's average daily temperature ranges from 37 to 90 degrees Fahrenheit, but the extreme low and high temperatures have been 11 and 111 degrees Fahrenheit, respectively (Western Regional Climate Center, 1999). The historical annual average precipitation is approximately 18 inches. The rainy season begins in November and ends in March. Average monthly precipitation during the winter months is about 3 inches, but records show that the monthly precipitation has been as high as 9.7 inches and as low as 0 inches. Relative humidity in the region ranges from 26 percent to 91 percent. Low humidity usually occurs in the summer months, from May through September. The combination of hot and dry weather during the summer results in high water demands during the summer.

2.3 Water Supply Facilities

Groundwater from 24 wells is the only source of water supply for the City of Lodi. Currently, all wells are active production wells. The locations of the groundwater wells in Lodi are illustrated in Figure 2-1. Well 10R has been permanently abandoned.

2.3.1 Wells. Twenty-four wells with a combined capacity of 33,695 gallons per minute (gpm) provide the City of Lodi's annual water production. The wells operate automatically on water pressure demand and pump directly into the distribution system. The water is periodically chlorinated three to six weeks per year. The current capacity of existing wells is summarized in Table 2-1. Several of the wells have granular activated carbon (GAC) treatment to remove dibromochloropropane (DBCP).



DATE	PROJECT	SITE	FIGURE
3-12-01	20650	City of Lodi	2-1
BROWN AND CALDWELL		TITLE: City of Lodi System	

Table 2-1. City of Lodi System Wells

Well number	Well capacity, gpm[b]	Well capacity, mgd[c]
1R	1,250	1.8
2	850	1.2
3R	825	1.2
4R[a]	1,640	2.4
5	1,325	1.9
6R	1,570	2.3
7	1,200	1.7
8	950	1.4
9	1,150	1.7
11R	1,410	2.0
12	810	1.2
13	1,060	1.5
14	1,675	2.4
15	1,625	2.3
16[a]	1,050	1.5
17	2,000	2.9
18[a]	1,750	2.5
19	1,230	1.8
20[a]	1,900	2.7
21	2,160	3.1
22[a]	1,475	2.1
23[a]	1,520	2.2
24	1,570	2.3
25	1,700	2.4
Total well water supply	33,695	48.5

[a] Wells with GAC treatment.
[b] gpm = gallons per minute.
[c] mgd = million gallons per day.

2.4 Distribution System

The City of Lodi's distribution system consists of an elevated storage tank, one storage facility and pumping station, and the piping system. A one million gallon storage tank, located east of Highway 99 on Thurman Street, stores groundwater from nearby wells to meet peak hour demands and fire flows. The 100,000 gallon elevated storage tank is located on North Main Street. The storage facilities and their capacities are given in Table 2-2.

The distribution system ranges in size from 14-inch mains down to 2-inch mains. The entire distribution system consists of approximately 207 miles of pipe. Pipe size distribution is included in Table 2-3. The City has commenced a pipe replacement program to reduce system leaks.

Table 2-2. City of Lodi's System Storage

Name	Volume, million gallons
Elevated storage tank	0.1
Ground storage tank	1.0
Total	1.1

Table 2-3. City of Lodi's Distribution System

Pipe diameter, inches	Length of pipe, miles
2	13.8
2.5	0.9
3	17.7
4	2.7
6	68.8
8	60.4
10	32.4
12	6.7
14	3.7
Total	207

CHAPTER 3

HISTORICAL AND PROJECTED WATER USE

Water demand projections provide the basis for sizing and staging future water facilities. Water use and production records, combined with projections of population and urban development, provide the basis for estimating future water requirements. This chapter presents a summary of available demographic and water use data and the resulting projections of future water needs for the City of Lodi.

3.1 Population and Housing

Historical population and housing data were obtained from the City of Lodi. An annual population growth rate of 1.5 per year was obtained from the Lodi Wastewater Master Plan (West Yost & Associates, 2001).

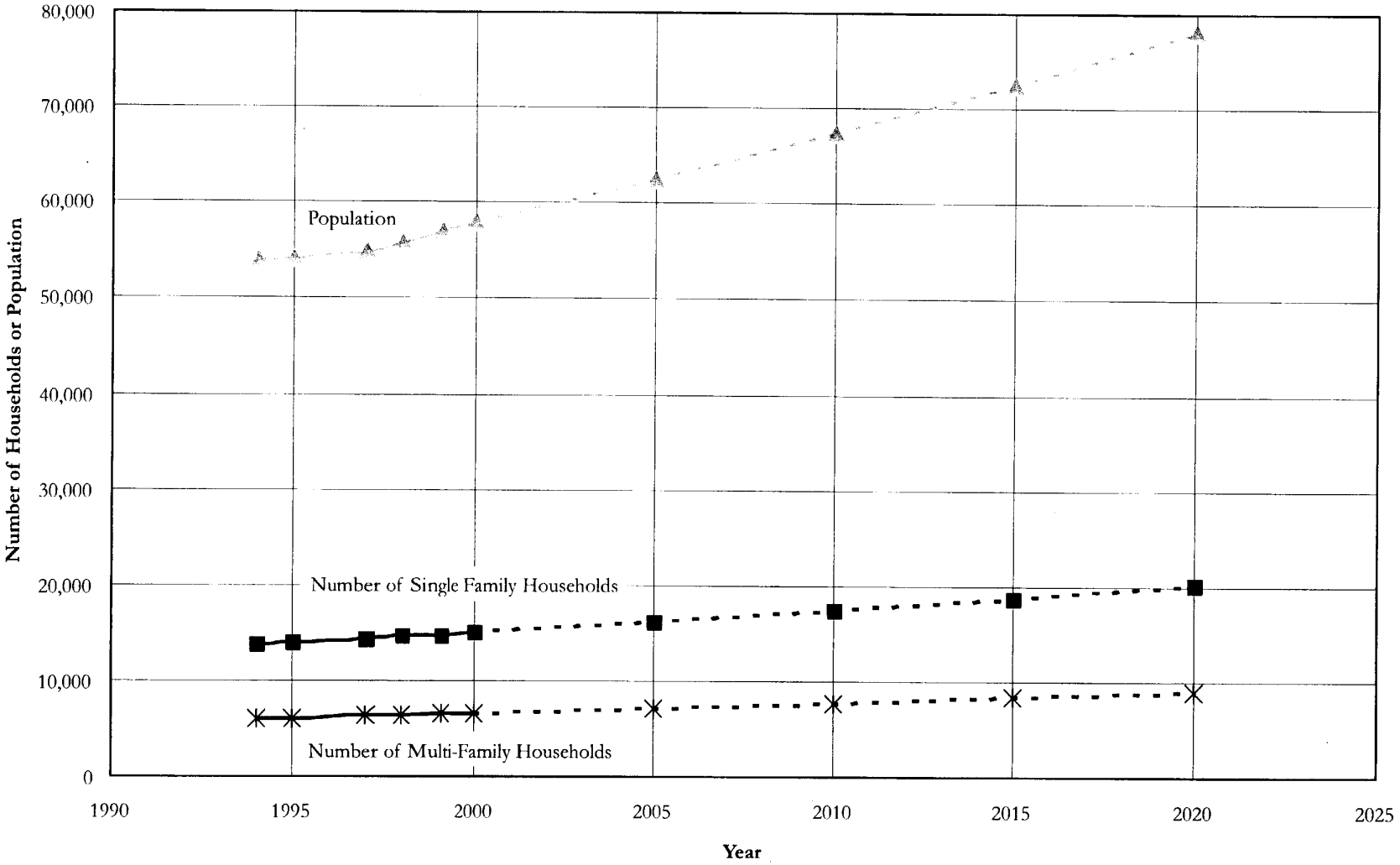
It is estimated that the current population in Lodi is approximately 57,935 people. This population is expected to reach 78,030 by 2020 based on the assumed annual growth rate of 1.5 percent. A summary of the historic and projected population and housing in Lodi is presented in Table 3-1 and illustrated in Figure 3-1.

The number of connections to the City's water system per year for the last ten years is shown in Table 3-2. The number of connections by customer classification, as counted by the City of Lodi in the year 1999, are shown in Table 3-3. There has been significant growth in the number of industrial connections over the last five years.

Table 3-1. Population and Housing Projections

Year	Single family households	Multi-family units	Population
1994	13,770	5,962	53,903
1995	14,035	6,015	54,000
1997	14,383	6,300[a]	54,700
1998	14,701	6,400[a]	55,681
1999	14,755	6,500[a]	56,926
2000	14,976	6,600[a]	57,935
2005	16,134	7,100[a]	62,412
2010	17,381	7,700[a]	67,236
2015	18,724	8,300[a]	72,432
2020	20,171	8,900[a]	78,030

Note: Dashed line represents division between historical and projected data.
[a] Multi-family units estimated by assuming 10 dwelling units per multi-family water connection.



BROWN AND CALDWELL	DATE 2-7-01 PROJECT 20650	City of Lodi TITLE Historical and Projected Population and Housing within the City of Lodi	FIGURE 3-1

Table 3-2. City of Lodi System Connections

Year	Connections
1991	21,769[a]
1994	20,963[a]
1995	21,289[a]
1996	16,172
1997	16,303
1998	16,624
1999	16,753

Source: City of Lodi Public Works Department
[a] Multi-family dwelling units included in value.

Table 3-3. City of Lodi System Connections by Customer Classification, Year 1999

Classification	Connections
Single family	14,755
Multi-family[a]	648
Commercial/institutional	1,271
Industrial	53
Irrigation/landscaping	26
Total	16,753

Source: City of Lodi Public Works Department
[a] Includes mobile home connections.

In summary, from 1994 to 1999, the City of Lodi population increased 5.6 percent, which is a growth rate of approximately 1.1 percent per year. Population is expected to increase by 35 percent, from 57,935 in 2000 to 78,030 in 2020.

3.2 Historical Water Use

Records of historical water production were obtained from the City of Lodi Public Works Department. These data include maximum day and annual water production. Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial, and public authority connections, as well as unaccounted-for water.

3.2.1 Annual Water Production. Groundwater production from 1970 to 1999 is presented in Table 3-4. Total water production in 1999 was 16,587 acre-feet (ac-ft). Historical annual water use for the last 23 years is presented in Table 3-5. Water use by customer class is not available because most of the City's customers are not metered.

Table 3-4. Historical Groundwater Production, acre-feet/year

Year	Production, ac-ft
1970	11,462
1971	12,303
1972	11,686
1973	12,204
1974	12,002
1975	12,294
1976	13,607
1977	10,578
1978	11,477
1979	12,349
1980	12,312
1981	12,487
1982	11,560
1983	11,539
1984	13,997
1985	14,813
1986	15,080
1987	15,304
1988	15,359
1989	14,653
1990	15,387
1991	13,313
1992	13,985
1993	14,013
1994	14,301
1995	14,390
1996	15,102
1997	16,330
1998	14,461
1999	16,587

Source: City of Lodi Public Works Department

3.2.2 Maximum Day Demand. Daily demand fluctuates throughout the year based primarily on seasonal climate changes. Water demands are significantly higher in the summer than the winter. System production facilities must be sized to meet the demand on the maximum day of the year, not just the average. Water systems are sized to meet the greater of either the maximum day demand plus fire flow or peak hour demand. Fire flow and peak hour demand are not addressed in this report.

The average day and maximum day demands for the years 1977 through 1999 are presented in Table 3-5. The maximum day demand in 1999 was 19,667 gpm, in comparison to the total well production capacity of 33,695 gpm. The ratio between average and maximum day demands provides a maximum day peaking factor that can be used to scale annual demand projections to maximum day levels. The average maximum day peaking factor from 1990 to 1999 is 1.94.

Table 3-5. Historical Water Production

	Annual average			Maximum day		
Year	ac-ft/yr	mgd	gpm	mgd	gpm	Peaking factor[b]
1977	10,578	9.44	6,556	19.28	13,389	2.04
1978	11,478	10.25	7,118	--[a]	--	--[a]
1979	12,349	11.02	7,653	22.50	15,625	2.04
1980	12,312	10.99	7,632	24.00	16,667	2.18
1981	12,487	11.15	7,743	22.34	15,514	2.00
1982	11,560	10.32	7,167	21.30	14,792	2.06
1983	11,539	10.30	7,153	21.67	15,049	2.10
1984	13,997	12.50	8,681	26.20	18,194	2.10
1985	14,814	13.22	9,181	--[a]	--	--[a]
1986	15,081	13.46	9,347	26.91	18,688	2.00
1987	15,305	13.66	9,486	27.00	18,750	1.98
1988	15,360	13.71	9,521	28.40	19,722	2.07
1989	14,654	13.08	9,083	28.50	19,792	2.18
1990	15,387	13.74	9,542	24.29	16,868	1.77
1991	13,313	11.88	8,250	21.55	14,965	1.81
1992	13,985	12.48	8,667	24.00	16,667	1.92
1993	14,013	12.51	8,688	24.10	16,736	1.93
1994	14,301	12.77	8,868	22.94	15,931	1.80
1995	14,390	12.85	8,924	24.64	17,111	1.92
1996	15,102	13.48	9,361	27.93	19,396	2.07
1997	16,330	14.58	10,125	28.68	19,917	1.97
1998	14,461	12.91	8,965	29.66	20,597	2.30
1999	16,587	14.81	10,285	28.32	19,667	1.91
2000	--[a]	--[a]	--	--[a]	--	--[a]
Average 1977 – 1999						
Average 1990 – 1999						

Source: City of Lodi Public Works Department

[a] Data unavailable.

[b] Maximum day peaking factor = maximum day demand/annual average day demand.

3.2.3 Unaccounted-for Water. Unaccounted-for water use is unmetered water use such as from fire protection and training, system and hydrant flushing, sewer cleaning, construction, system leaks, and unauthorized connections. Unaccounted-for water can also result from meter inaccuracies. Since the City of Lodi's system is not completely metered, data are unavailable for determining the percent of unaccounted-for water. Unaccounted-for water is generally assumed to be approximately 10 percent of total water production.

3.3 Unit Water Use

Historical unit water use expressed as gallons per connection per day (gpd/connection) and as gallons per capita per day (gpd/capita) are shown in Table 3-6. These unit demands include unaccounted-for water.

Table 3-6. Connection and Population Unit Water Use

Year	Connection unit water use demands, gpd/connection[a]	Population unit water use demands, gpd/capita[b]
1996	834	248
1997	894	267
1998	777	232
1999	884	260

[a] Gallons per connection per day.
[b] Gallons per capita per day.

3.4 Projected Water Demands

Future water demands are estimated in this report based on a constant 1.5 percent annual water demand growth rate. Demands were projected based on actual water use in 1999. These projections are shown in Table 3-7 and illustrated on Figure 3-2. By 2020, average annual water demands are expected to increase by 36 percent, from 14.8 mgd (16,587 ac-ft/yr) in 1999 to 20.3 mgd (22,727 ac-ft/yr) in 2020. Reductions to water use due to conservation measures taken in the future are not reflected in the projected water demands.

Table 3-7. Total Projected Water Demands

	Annual average		Maximum day
Year	ac-ft/yr	mgd	mgd
2000	16,874	15.1	29.2
2005	18,178	16.2	31.5
2010	19,583	17.5	33.9
2015	21,096	18.8	36.5
2020	22,727	20.3	39.4

BROWN AND CALDWELL	DATE 2-7-01	City of Lodi	FIGURE
	PROJECT 20650	TITLE Historical and Projected Water Demand within the City of Lodi	3-2

CHAPTER 4

WATER SUPPLY QUANTITY

The City of Lodi currently uses groundwater as its sole source of supply. This chapter describes the groundwater basin, current and projected water supplies, water supply reliability, and water shortage expectations.

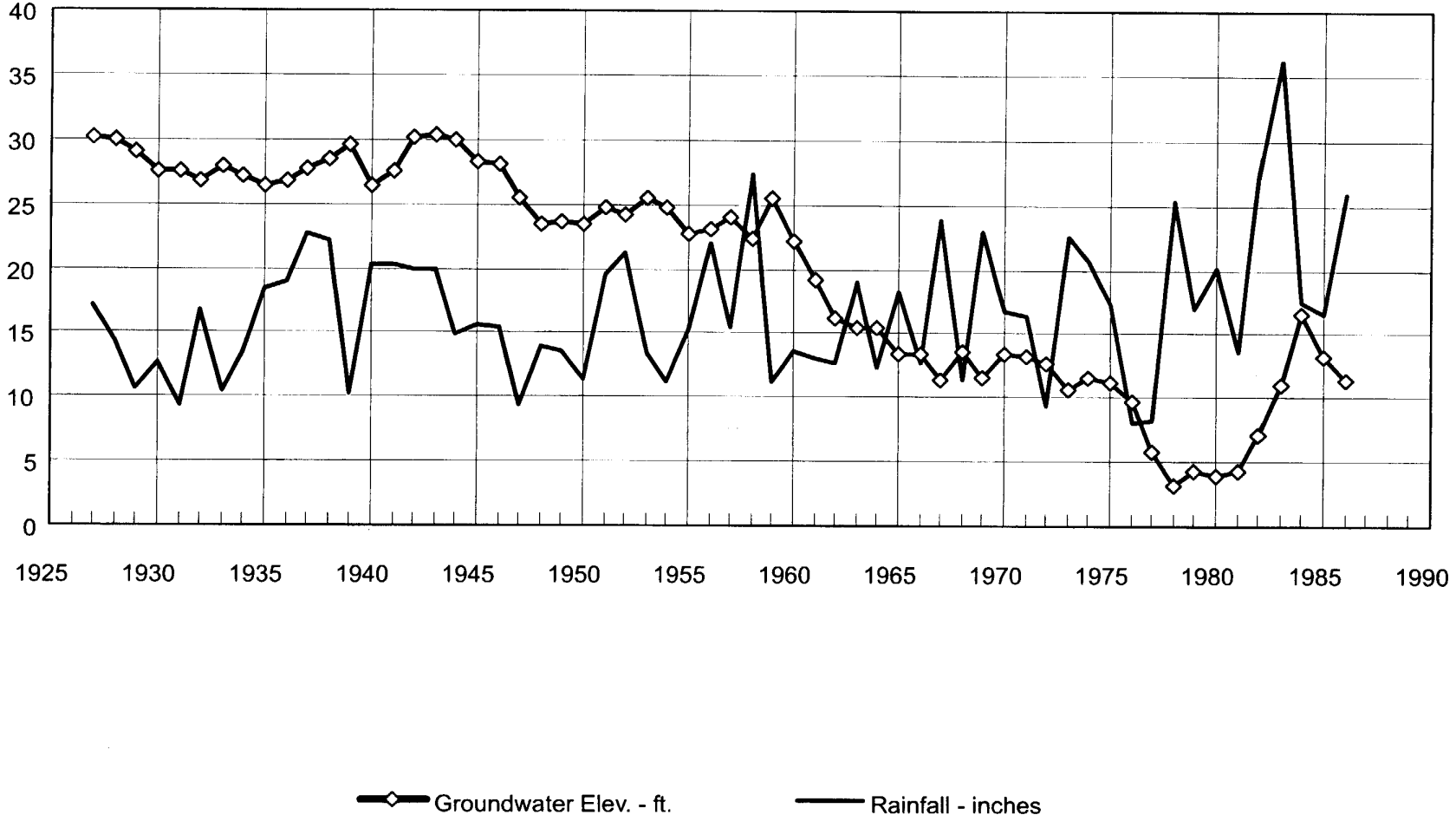
4.1 Groundwater

This section describes the groundwater supply and its physical and legal constraints. No surface water is currently used in the City of Lodi water system. However, as a result of a 1930's lawsuit, the City does have a limited entitlement to 3,600 acre-feet of surface water (21 percent of the City's 2000 demand) from the Mokelumne River/East Bay Municipal Utility District. The availability of this water to the City is under question due to the number of conditions specified under this "Lodi Decree".

4.1.1. Description. The groundwater basin underlying the City of Lodi is part of the longer San Joaquin Valley groundwater basin. The groundwater basin in the Lodi area occurs under unconfined and semi-confined conditions. The Mehrten Formation is the most productive fresh water-bearing unit.

The City of Lodi is located within the geomorphic province known as the Central Valley, which is divided into the Sacramento Valley and the San Joaquin Valley. The Central Valley is a large, northwestward-trending, asymmetric structural trough that has been filled with several miles of thick sediment (USGS 1986). The City of Lodi lies within the San Joaquin Hydrologic Basin (DWR, Bulletin 118) which straddles portions of both the Sacramento and San Joaquin Valleys. Sediments of the San Joaquin Valley consist of interlayered gravel, sand, silt, and clay derived from the adjacent mountains and deposited in alluvial-fax, floodplain, flood-basin, lacustrine, and marsh environments. Hydrogeologic units in the San Joaquin Basin include both consolidated rocks and unconsolidated deposits. The consolidated rocks include 1) the Victor Formation, 2) Laguna Formation, and 3) the Mehrten Formation. The consolidated rocks generally yield small quantities of water to wells except for the Mehrten Formation which is an important aquifer (DWR, internet site). The unconsolidated deposits include 1) continental deposits, 2) lacustrine and marsh deposits, 3) older alluvium, 4) younger alluvium, and 5) flood-basin deposits. The continental deposits and older alluvium are the main water-yielding units in the unconsolidated deposits.

Groundwater levels in the City of Lodi area are generally decreasing. The groundwater levels also fluctuate over time depending on precipitation, aquifer recharge, and pumping demands. This decrease in groundwater levels is an indicator of an overdrafted groundwater basin. Groundwater elevations relative to mean sea level (MSL) and the corresponding annual precipitation from 1927 through 2000 are shown in Figure 4-1. Overall, the average annual decrease in groundwater levels from 1927 to 2000 has been 0.35 feet per year. Generally, groundwater elevations have decreased with the increase in population and water production. However, annual rainfall also influences groundwater elevation. The groundwater level increase from 1981 to 1984 can be partially attributed to the increase per year in annual rainfall from 1981 to 1983. Groundwater elevations for



BROWN AND CALDWELL	DATE 3-12-01 PROJECT 20650	City of Lodi TITLE Historical Groundwater Levels and Precipitation in the City of Lodi	FIGURE 4-1

the years 1927 to 1961 were obtained from East Bay Municipal Utility District (EBMUD) for the City's six square mile area. Groundwater elevation data from 1962 to the present were obtained from the City's Public Works Department for Well No. 2, one of the oldest production wells in Lodi.

4.1.2 Physical Constraints. The City of Lodi's system currently has twenty-four active wells with a total pumping capacity of 48.5 mgd. The physical constraints on the groundwater supply are the pumping capacity of the existing wells. However, the fact that the groundwater basin is overdrafted means that in the long term the groundwater supply is something less than the current annual pumping rate.

The declining groundwater basin is a result of the groundwater extraction by all groundwater pumpers in the area. This includes groundwater pumping by other cities, agriculture, private well owners, as well as the pumping by the City of Lodi. The City will likely have to reduce its groundwater pumping in the long-term as part of what will have to be a regional effort to stabilize the groundwater basin. This could be accomplished by three possible approaches:

1. The City reduces its demand and groundwater pumping to a yet to be defined sustainable rate.
2. The City utilizes surface water as an additional supply to offset reductions in groundwater pumping. A conjunctive use project could be implemented that utilizes surface water as a supply in wet years, thereby allowing for a net reduction in groundwater pumping.
3. The City helps provide surface water to others, such as agricultural customers, to reduce groundwater pumping in the area by others.

4.1.3 Legal Constraints. There are no legal constraints on groundwater pumping. In California, the State is not authorized by the Water Code to manage groundwater. California landowners have a correlative right to extract groundwater for beneficial use. As a municipal water supplier, the City's appropriate rights are junior to overlying landowners.

4.2 Groundwater Quality

The United States Environmental Protection Agency (EPA) is currently considering or has implemented several new or revised drinking water standards. The Radon, Arsenic, and the Groundwater Rule may impact the City of Lodi.

Radon is not currently regulated, although EPA recently proposed a maximum contaminant level (MCL) of 300 picoCuries/liter (pCi/L). Water systems in states that develop multimedia mitigation (MMM) plans to address indoor air radon levels, or in absence of a state MMM program, that initiate enhanced indoor air radon level reduction programs, would be able to comply with an alternate MCL of 4,000 pCi/L. Treatment for compliance with the proposed radon standard may need to be provided to all subject groundwater sources within the specified time frame following promulgation of the final rule. The average radon concentration in Lodi's 24 wells from 1997 to 1999 was 450 pCi/L.

As required by the 1996 amendments to the Safe Drinking Water Act (SDWA), the arsenic standard in drinking water has been recently changed to a MCL of 10 µg/L from the previous 50 µg/L

standard. None of the 24 Lodi wells sampled from 1997 to 2000 contained arsenic concentrations higher than the new standard of 10 μg/L. Therefore, the new arsenic standard is not an issue for the City.

Dibromochloropropane (DBCP) was a chemical previously used by farmers in the Lodi area to control nematodes in vineyards and other crops. DBCP was banned in California in 1977, but is still present in trace levels in some groundwater supplies. The MCL for DBCP has been set at 0.2 micrograms per liter (μg/L). The year 2000 average concentration of DBCP in water delivered from Lodi's 24 wells was 0.04 μg/L. Approximately a fourth of Lodi's wells have granular activated carbon (GAC) filters to remove DBCP, while the remaining wells have no detectable or trace amounts of DBCP (City of Lodi Public Works Department, 2000).

The U.S. EPA is proposing the Ground Water Rule (GWR), which contains measures to establish multiple barriers to further protect against bacteria and viruses in drinking water from ground water sources. The proposed GWR will specify when corrective action (including disinfection) is required to further protect groundwater system consumers from bacteria and viruses. The GWR is scheduled to be issued as a final regulation in summer 2001. The City of Lodi may be required to disinfect (i.e. chlorinate) its groundwater sources as a result of this proposed rule.

4.3 Current and Projected Water Supplies

The projected annual sustainable water supply and demand for the Lodi system is compared and summarized in Table 4-1. Recycled water supply is addressed in Chapter 6. As described earlier, the groundwater basin is in an overdraft condition. Therefore, the sustainable groundwater extraction rate for the City is likely something less than current annual pumping rates. For the purposes of this study, the sustainable groundwater supply is assumed to be approximately equivalent to the 1980 pumping rate, or approximately 12,000 ac-ft/yr. This assumption regarding sustainable groundwater supply is only an approximation since the safe yield of the groundwater basin underlying the City has not been defined. As a comparison, the 1990 through 1999 groundwater use averaged 14,787 ac-ft/yr. As shown in Table 4-1, the water supply is not adequate to meet projected demands.

Table 4-1. Water Supply and Demand Comparison, ac-ft/yr

	2000	2005	2010	2015	2020
Sustainable Water supply					
Surface water	0	0	0	0	0
Groundwater[a]	12,000	12,000	12,000	12,000	12,000
Recycled water[b]	0	0	0	0	0
Total	12,000	12,000	12,000	12,000	12,000
Demand	16,874	18,178	19,583	21,096	22,727
Surplus or (Deficit)	-4,874	-6,178	-7,583	-9,096	-10,727

Units of Measure: ac-ft/yr
[a] Based on 1980 pumping rate.
[b] Based on current conditions. Recycling may occur in the service area within 20 years.

4.4 Water Supply Reliability

The annual quantity of groundwater available does not significantly vary up or down in relation to wet or dry years. The estimated year 2020 water supply available in average, dry, and multiple dry

years is presented in Table 4-2. As shown in Table 4-2, the sustainable water supply is not adequate to meet projected demands during multiple dry years.

Table 4-2. Water Supply Reliability, 2020, ac-ft/yr

	Average/normal water year	Single dry water year	Multiple dry water years		
			Year 1	Year 2	Year 3
Sustainable Water supply					
Surface water	0	0	0	0	0
Groundwater[a]	12,000	12,000	12,000	12,000	12,000
Recycled water[b]	0	0	0	0	0
Total	12,000	12,000	12,000	12,000	12,000
2020 Demand	22,727	22,727	22,727	22,727	22,727
Surplus or (Deficit)	-10,727	-10,727	-10,727	-10,727	-10,727

Units of measure : ac-ft/yr
[a] Based on 1980 pumping rate.
[b] Based on current conditions. Recycled water may be available by 2020.

4.5 Water Shortage Expectations

Short-term groundwater supply shortages are not expected. The City currently has six wells fitted with emergency diesel-powered generators during power outages, which increases the reliability of supply. As described earlier, the groundwater basin is in an overdraft condition that will require the City to eventually take steps to reduce overall groundwater pumping. Continuing decline of groundwater levels could result in the need to drill deeper wells.

The City of Lodi is actively participating in acquiring future water supplies in the northeastern San Joaquin County area. The City is part of the Northeastern San Joaquin County Groundwater Banking Authority whose purpose and goals include negotiating a conjunctive use project with the East Bay Municipal Utility District (EBMUD). The latest conjunctive use water planning and principles and negotiations with EBMUD are included in Appendix D.

The City of Lodi's Water Shortage Contingency Plan is included in Appendix F.

CHAPTER 5

WATER CONSERVATION BEST MANAGEMENT PRACTICES

Water conservation is a method available to reduce water demands, thereby reducing water supply needs for the City of Lodi (City). This chapter presents an analysis of water conservation best management practices (BMPs) and a description of the methods and assumptions used to conduct the analysis.

The unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by the DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban BMPs for conserving water. This consensus-building effort resulted in a Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), as amended September 16, 1999, among parties, which formalizes an agreement to implement these BMPs and makes a cooperative effort to reduce the consumption of California's water resources. The BMPs as defined by the MOU are presented in Table 5-1. The MOU is administered by the California Urban Water Conservation Council (CUWCC). The City of Lodi is not a signatory of the MOU.

The value to the City of signing the MOU, which is a voluntary agreement, cannot be quantified. If the City desires to demonstrate that water use efficiency is being addressed to industry standards of practice, then signing the MOU should be considered. Being a signatory of the MOU may be a future requirement to receive water project grant and loan funding from the State.

The MOU requires that a water utility implement only the BMPs that are economically feasible. If a BMP is not economically feasible, the water utility may request an economic exemption for that BMP. The BMPs as defined in the MOU are generally recognized as standard definitions of water conservation measures.

Table 5-1. Water Conservation Best Management Practices

No.	BMP Name
1.	Water survey programs for single-family residential and multi-family residential connections.
2.	Residential plumbing retrofit.
3.	System water audits, leak detection and repair.
4.	Metering with commodity rates for all new connections and retrofit of existing connections.
5.	Large landscape conservation programs and incentives.
6.	High-efficiency washing machine rebate programs.
7.	Public information programs.
8.	School education programs.
9.	Conservation programs for commercial, industrial, and institutional accounts.
10.	Wholesale agency assistance programs.
11.	Conservation pricing.
12.	Conservation coordinator.
13.	Water waste prohibition.
14.	Residential ULFT replacement programs.

5.1 Current Water Conservation Program

Water conservation in Lodi is supported by the City Council and Lodi's citizens. The current program consists mainly of outdoor watering restrictions enforced by water conservation patrol staff, public education, and an in-school education program.

The City has had an enforced ordinance for water conservation continuously since 1977 and it has developed into one of the most comprehensive on-going programs functioning in the San Joaquin Valley. A copy of the conservation ordinance information sheet is included in Appendix C in English and Spanish. The program consists mainly of outdoor watering restrictions enforced by water conservation patrol officers, public education, and an in-school education program. From 1977 through 1988, a single water conservation officer patrolled during the months of May through October. Since 1989, three to four water conservation officers have patrolled from May through October to intensify and enhance the program.

The Water Conservation Patrol staff's duties are to enforce the provisions outlined in the City Ordinance. These include prohibition of water waste, provision for dissemination of information and advice to aid water customers, and notices of violation issuance for water wasting. The ordinance information sheet is given out when water wasting is observed. All violations are recorded on a violation card (Appendix C) and filed by address. The success of Lodi's water conservation program was evaluated in an in-house study. The summary report of the study is given in Appendix C.

A Water Educational Program was introduced to Lodi elementary schools in 1986. This program supplements and enhances the City of Lodi's total effort to conserve water, as well as other natural resources. In 1986, four pilot schools were introduced to the program. Presentations have been given in 10 schools, including four parochial schools, within the Lodi City limits. In 1998, there were 252 classroom presentations. The program includes water science demonstrations with the objective of instilling water awareness and providing information about Lodi's water system and water conservation techniques.

The education program is aimed at grades K through 6th. It is felt to be most cost effective to develop water awareness and a sense for water conservation while children are most impressionable during their formative years. A more detailed discussion of the educational program is contained in Appendix C.

The City water conservation program participates in local fairs, including the Crime Prevention Fair (sponsored by Lodi Police Dept.), the Conservation Fair (sponsored by local agencies concerned with conservation), and the Lodi Grape Festival and Harvest Fair, and other special events. Staff converses with the fairs' visitors about Lodi's water conservation program and answers questions they might have concerning water issues. The City of Lodi also hands out information sheets and conservation kits and holds contests for prizes such as low flow shower heads.

Watering day reminders have been periodically included on the utility bills and on Lodi's cable TV station throughout the summer months. Newspaper articles and ads are also published throughout the year in Lodi's and Stockton's newspapers reminding Lodi residents of the water conservation regulations, offering conservation tips, and relaying the successes of the program. Attractive

refrigerator magnets with the watering day and hour schedules are given out by patrol officers and at the local fairs.

5.2 Economic Analysis Methodology and Assumptions

An economic analysis was conducted for 6 of the 14 BMPs (Table 5-1) that are described in the MOU and that the City of Lodi is not currently implementing (i.e., BMP nos. 1, 4, 5, 6, 9 and 14). BMP 4 is analyzed for two cases. Case 1 consists of installing meters and meter boxes at all pre-1992 connections. Case 2 consists of installing meters only at all post 1992 connections. The intent of the analysis is to determine if the BMPs not being implemented are not economically feasible. The remaining BMP 2 is not analyzed because the City is already currently implementing it. Economic analyses were not done for BMPs 3, 7, 8, 10, 11, 12, and 13 because they are essentially non-quantifiable, but essential to the success of those BMPs that are quantifiable. These BMPs are considered non-quantifiable because the water savings cannot be accurately estimated. These non-quantifiable BMPs have already been implemented by the City.

Assumptions used in the economic analysis for each BMP are described in Table E-1 (Appendix E). Directly beneath each assumption is a brief description of the rationale and/or supporting evidence for that assumption. Common assumptions for all BMPs are the value of conserved water ($500/ac-ft), and the real discount rate (6.15%). The real discount rate was calculated from the assumed real cost of money (8.82%) and the assumed long-term inflation rate (2.52%) using the precise conversion method (A&N Technical Services, 2000. pg A-2). The value of conserved water includes estimated costs of new well construction and the costs of importing surface water to reduce the groundwater overdraft. Also included are non-water utility benefits, such as reduced wastewater conveyance and treatment costs. A breakdown of the number of metered and unmetered connections for each customer category in 1999 is presented in Table 5-2. State law requires that meters will be installed on new residential connections.

Table 5-2. City of Lodi Connections by Classification, Year 1999

Classification	Connections	
	Metered	Unmetered
Single family	0	14,755
Multi-family	0	648
Commercial/institutional	956	315
Industrial	53	0
Irrigation/landscaping	17	9
Other	0	0
Total	1,026	15,727

Source: City of Lodi

The economic analysis was performed using Microsoft® Excel 97, a spreadsheet program. A separate, customized worksheet for each BMP is presented in Appendix E. Each BMP economic analysis spreadsheet projects, on an annual basis, the number of interventions and the dollar values of the benefits and costs that would result from implementing a particular BMP. Terms and formulas that are common to all the worksheets are defined in Table 5-3.

5.3 Economic Analysis Results

The results of the economic analysis in terms of the benefit/cost (B/C) ratio, the simple pay-back period, the discounted cost per ac-ft of water saved, and the net present value (NPV) per ac-ft of water saved for each BMP are presented in Table 5-4.

Annual water savings and costs for each of the BMPs with a B/C ratio equal to or greater than one are presented graphically on Figures 5-1 and 5-2 and summarized in Table 5-5. The number of annual interventions required for each BMP and the annual expenditure necessary if the City of Lodi is to be in compliance with the MOU for all cost effective, quantifiable BMPs is presented in Table 5-5. Interventions are actions or activities required to implement each BMP.

The water savings and costs associated with BMPs 3, 7, 8, 10, 11, 12, and 13 are not included in Figures 5-1 and 5-2 and Table 5-5, since no specific level of effort is defined in the MOU for these BMPs.

5.4 Additional Issues

This section describes additional issues required to be addressed by the Urban Water Management Planning Act. Non-economic factors, including environmental, social, health, technological and customer impacts are not thought to be significant in deciding which BMPs to implement. No water supply projects are currently planned that would supply water at a higher unit cost. The City of Lodi has the legal authority to implement the BMPs.

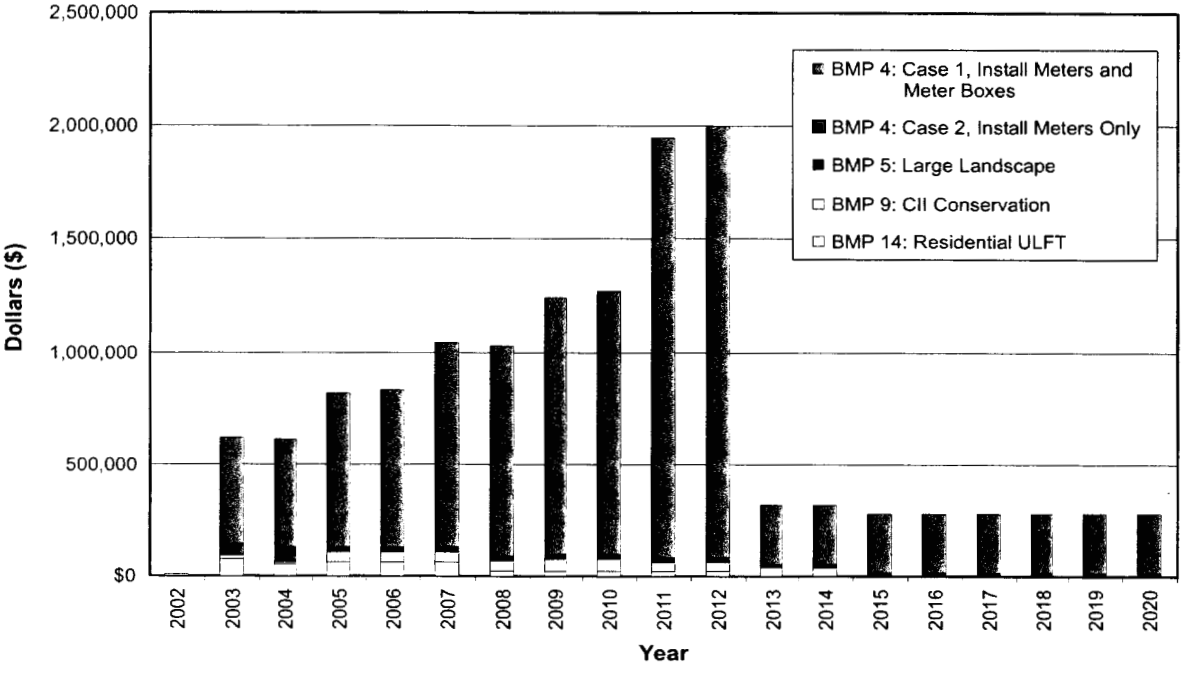
Table 5-3. Definition of Terms Used in the Economic Analysis

Term	Definition	Comments
BENEFITS:		
Avoided Capital Costs	Capital costs that are avoided by implementing the BMP.	An example is the cost of a well that would not have to be installed due to implementation of the BMP.
Avoided Variable Costs	Variable costs that are avoided by implementing the BMP.	An example is the cost of electricity that would be saved if the BMP were implemented.
Avoided Purchase Costs	Purchase costs that are avoided by implementing the BMP.	An example is the cost of purchasing water that would not be needed due to implementation of the BMP.
Total Undiscounted Benefits	The sum of avoided capital costs, avoided variable costs and avoided purchase costs.	
Total Discounted Benefits	The present value of the sum of avoided capital costs, avoided variable costs and avoided purchase costs.	An annual percentage rate consisting of the cost of borrowing money minus the inflation rate.
COSTS:		
Capital Costs	Capital costs incurred by implementing the BMP.	For example, the cost to purchase and install meters for BMP 4.
Financial Incentives	The cost of financial incentives paid to connections.	Copay or distribution for purchasing low-flow plumbing devices or washing machines are examples of financial incentives.
Operating Expenses	Operational expenses incurred during implementation of the BMP.	
Total Undiscounted Costs	The sum of capital costs, financial incentives, and operating expenses.	
Total Discounted Costs	The present value of the sum of capital costs, financial incentives, and operating expenses.	The discount rate is used to calculate discounted costs from undiscounted costs.
NET PRESENT VALUE	Total discounted benefits minus total discounted costs.	A value greater than zero indicates an economically justifiable BMP.
RESULTS:		
Benefit/Cost Ratio	The sum of the total discounted benefits divided by the sum of the total discounted costs.	A ratio greater than one indicates an economically justifiable BMP.
Simple Pay-Back Period	The number of years required for the benefits to pay back the costs of the BMP, calculated as the sum of the total discounted costs divided by the average annual total discounted benefits.	A low value is considered economically attractive.
Discounted Cost/Water Saved	The present-value cost to save one acre-foot of water, calculated as the sum of the total discounted costs divided by the total acre-feet of water saved over the study period.	A low value is considered economically attractive because it indicates a low implementation cost. Value must be less than the marginal cost of new water to be cost effective.
Net Present Value/Water Saved	The net value of saving one acre-foot of water, calculated as the sum of the net present value divided by the total acre-feet of water saved over the study period.	A high value is considered economically attractive.

Table 5-4. Results of Economic Analysis

BMP No.	BMP Name	Total discounted cost over study period ($)	Total water saved[a] (ac-ft)	Benefit/ cost ratio	Simple payback period (years)	Discounted cost/water saved ($/ac-ft)	Net present value/ water saved ($/ac-ft)
1	Water survey programs for single-family residential and multi-family residential connections.	112,691	307	0.8	15	368	-56
4 - Case 1 *(meters and meter boxes)*	Metering with commodity rates for all new connections and retrofit of existing connections	7,430,344	112,201	3.6	6	66	170
4 - Case 2 *(meters only)*	Metering with commodity rates for all new connections and retrofit of existing connections	239,225	9,930	11.4	2	24	251
5	Large landscape conservation programs and incentives.	25,414	449	5.6	2	57	262
6	High-efficiency washing machine rebate programs.	133,978	410	0.7	28	327	-90
9	Conservation programs for commercial, industrial, and institutional (CII) accounts.	279,169	1,541	1.4	9	181	79
14	Residential ULFT replacement programs.	329,468	1,591	1.2	16	207	48

[a] Total water saved over study period. Study period is different for each BMP. Refer to Appendix E.
Note: This analysis includes non-water utility benefits, such as reduced wastewater conveyance and treatment costs.



Note: Costs are undiscounted costs.

Figure 5-1. City of Lodi BMP Implementation Costs

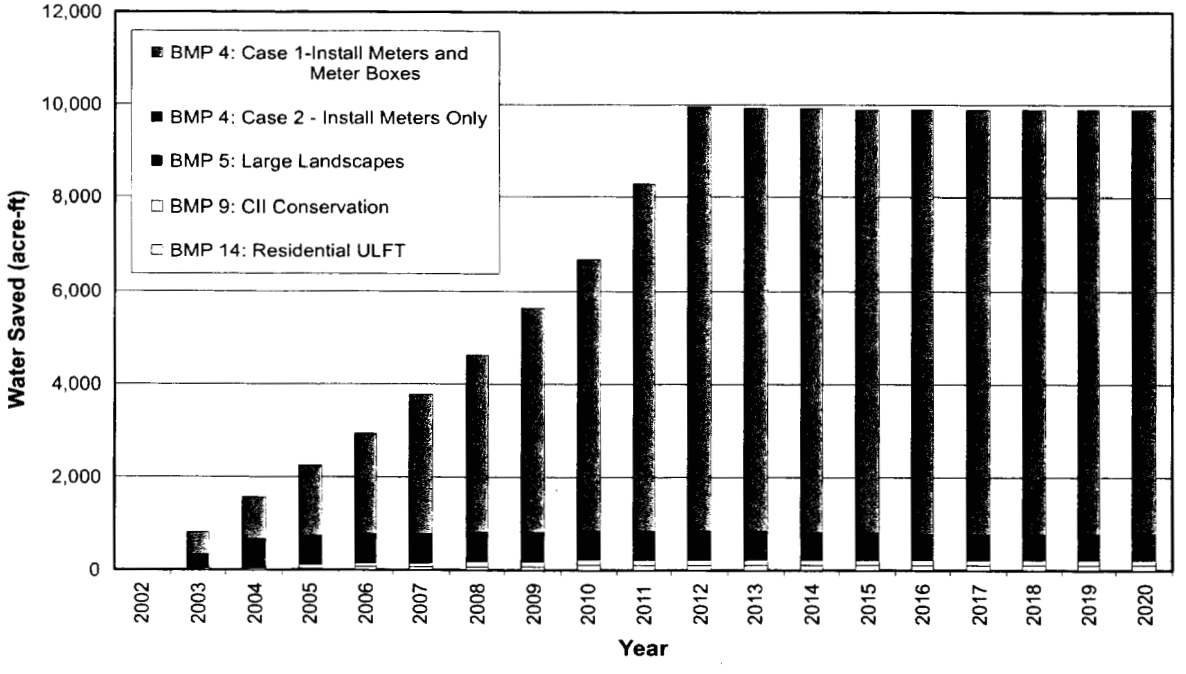


Figure 5-2. City of Lodi BMP Water Savings

Table 5-5. City of Lodi - Summary of BMP Annual Interventions, Water Saved and Cost

	BMP 1: Residential water surveys			BMP 4: Install meters *Case 1 – Install meters and meter boxes*			BMP 4: Install meters *Case 2 – Install meters only*			BMP 5: Large landscapes		
Year	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)
2002	B/C<1	B/C<1	B/C<1	0	0	0	0	0	0	0	0	0
2003				740	456	472,311	461	284	54,339	16	13	4,166
2004				740	912	485,637	461	567	62,628	16	26	4,166
2005				1,036	1,551	687,887	0	567	16,578	20	40	4,663
2006				1,036	2,189	706,542	0	567	16,578	20	54	4,663
2007				1,333	3,010	914,122	0	567	16,578	18	48	2,234
2008				1,333	3,831	938,108	0	567	16,578	18	42	2,234
2009				1,629	4,835	1,151,018	0	567	16,578	22	36	2,731
2010				1,629	5,838	1,180,334	0	567	16,578	22	31	2,731
2011				2,665	7,480	1,870,886	0	567	16,578	36	37	4,469
2012				2,665	9,122	1,918,858	0	567	16,578	36	44	4,469
2013				0	9,122	266,508	0	567	16,578	0	36	0
2014				0	9,122	266,508	0	567	16,578	0	27	0
2015				0	9,122	266,508	0	567	16,578	0	14	0
2016				0	9,122	266,508	0	567	16,578	0	0	0
2017				0	9,122	266,508	0	567	16,578	0	0	0
2018				0	9,122	266,508	0	567	16,578	0	0	0
2019				0	9,122	266,508	0	567	16,578	0	0	0
2020				0	9,122	266,508	0	567	16,578	0	0	0
Total				14,806	112,201	12,457,768	921	9,930	382,215	222	449	36,525

Note: B/C<1 indicates a benefit to cost ratio less than one, which is not cost effective. Annual BMP activities based on MOU guidelines.

[a] Interventions is the quantity or number of each item.

Table 5-5. City of Lodi - Summary of BMP Annual Interventions, Water Saved and Cost (Continued)

	BMP 6: Washing machine rebates			BMP 9: CII conservation			BMP 14: Residential ULFT			Total		
Year	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)	Interventions[a]	Water saved (ac-ft/yr)	Cost ($/yr)
2002	B/C<1	B/C<1	B/C<1	0	0	0	50	2	6,300	50	2	6,300
2003				16	14	11,652	600	20	75,600	1,833	787	618,069
2004				16	29	11,652	400	32	50,400	1,633	1,565	614,483
2005				285	48	43,135	500	47	63,000	1,841	2,254	815,263
2006				285	68	43,135	500	62	63,000	1,841	2,942	833,918
2007				288	76	45,077	500	78	63,000	2,138	3,780	1,041,012
2008				288	85	45,077	200	84	25,200	1,838	4,610	1,027,198
2009				297	105	51,874	200	90	25,200	2,148	5,633	1,247,402
2010				297	124	51,874	200	96	25,200	2,148	6,657	1,276,717
2011				273	121	34,396	200	102	25,200	3,174	8,308	1,951,529
2012				273	117	34,396	200	109	25,200	3,174	9,959	1,999,500
2013				273	105	34,396	0	109	0	273	9,939	317,482
2014				273	93	34,396	0	109	0	273	9,918	317,482
2015				0	93	0	0	109	0	0	9,904	283,086
2016				0	93	0	0	109	0	0	9,891	283,086
2017				0	93	0	0	109	0	0	9,891	283,086
2018				0	93	0	0	109	0	0	9,891	283,086
2019				0	93	0	0	109	0	0	9,891	283,086
2020				0	93	0	0	109	0	0	9,891	283,086
Total				2,865	1,541	441,064	3,550	1,591	447,300	22,364	125,711	13,764,872

Note: B/C<1 indicates a benefit to cost ratio less than one, which is not cost effective. Annual BMP activities based on MOU guidelines.
[a] Interventions is the quantity or number of each item.

CHAPTER 6

RECYCLED WATER

The purpose of this chapter is to provide information on recycled wastewater and its potential for use as a water resource in the service area of Lodi. The elements of the chapter are (1) the quantity of wastewater generated in the service area, (2) description of the collection, treatment, and disposal/reuse of that wastewater, (3) the current plans for water recycling, and (4) the potential for water recycling in the service area.

6.1 Wastewater Generation

Municipal wastewater is generated in the service area from a combination of residential, commercial, and industrial sources. The quantities of wastewater generated are proportional to the population and the water use in the service area. Estimates of average wastewater flows for the present and future conditions are presented in Table 6-1. The source of the estimates is the population projection in Chapter 3 and an assumed per capita unit flow of 116 gal/capita/day given in the Wastewater Master Plan (West Yost & Associates, 2001), which includes commercial and industrial use.

Table 6-1. Estimated Average Wastewater Generation

Year	Population	Annual average wastewater flow, mgd	Wastewater flow, ac-ft/yr
2000	57,935	6.6	7,400
2005	62,412	7.0	7,850
2010	67,236	7.5	8,400
2015	72,432	8.0	9,000
2020	78,030	8.5	9,550

Note: Current treatment plant capacity is 8.5 mgd (9,550 ac-ft/yr).

6.2 Wastewater Collection

The City of Lodi owns, operates, and maintains the wastewater system that serves the community. The sewer system consists of gravity sewers up to 48 inches in diameter, pumping stations, and force mains to collect wastewater from residential and commercial customers. The wastewater is collected and discharged to trunk sewers and interceptors and conveyed to the White Slough Water Pollution Control Facility (WSWPCF) for treatment. Industrial wastewater from a cannery is collected and conveyed separately from the residential wastewater to the WSWPCF for treatment or direct irrigation.

6.3 Wastewater Treatment and Recycling

The City owned and operated White Slough Water Pollution Control Facility (Facility) provides the wastewater treatment service for the City of Lodi and is located 6 miles outside of the water service area. The residential and commercial wastewater at the Facility undergoes conventional secondary treatment with activated sludge and chlorination/dechlorination. The Facility has a capacity to treat 8.5 million gallons per day (9,550 ac-ft/yr) of residential and commercial wastewater. The City would have to revise its discharge permit and implement some process improvements to be able to

treat to the full 8.5 mgd capacity. Currently, approximately 6.6 mgd (7,400 ac-ft/yr) of wastewater is treated at the Facility. Industrial process water from a nearby cannery is transported in a separate trunk line to the WSWPCF where it is stored in 45 acres of existing ponds for direct flood irrigation of feed and fodder crops.

All of the treated effluent from the Facility is recycled during the summer months. During the winter months, the treated effluent that is not recycled is discharged to White Slough which is part of the San Joaquin Delta. Adjacent to the WSWPCF, the City owns in excess of 1,000 acres of land and leases 641 acres to local farmers for the cultivation and harvesting of feed and fodder crops not intended for human consumption. The Facility has the flexibility to irrigate with domestic flow and cannery process water. All of the industrial process water influent is recycled for irrigation and ponding. If a process upset should occur, the domestic flow can be stored in holding ponds and further treated before discharging water to the Delta. In recent years, the City has also supplied recycled water from the domestic treatment process to produce steam for a 49-megawatt natural gas powered generator, and to replenish mosquito fish-rearing ponds. Total 1999 recycled water use in ac-ft outside of the water service area boundaries and surrounding the treatment plant is given in Table 6-2. Recycled water use does not replenish the quantity of water pumped by the City, but does reduce the pumping demand for groundwater and surface water near the Delta.

Table 6-2. 1999 Recycled Water Use Surrounding Lodi's White Slough Water Pollution Control Facility

Type	Recycled water use, acre-feet
Industrial effluent agricultural irrigation	1,631
Domestic effluent agricultural irrigation	2,599
Landscape irrigation	0.6
Mosquito fish-rearing ponds	156
Power generation facility	87
Total in 1999	4,474

6.4 Potential Water Recycling in the Lodi Service Area

Presently, there are no plans to construct the six miles of transmission lines and pumping stations needed to return treated wastewater to the water utility service area. The estimated $7.8 million cost of installing pumping facilities and a pipeline to convey recycled water to the service area from the wastewater treatment plant is considered to be expensive at this time compared to the cost of available groundwater. Therefore, at this time, the recycled water supply for the service area is projected to be 0 acre-feet per year for the next 10 years. The City will pursue the use of recycled water should it become an economical supply. Some unknown quantity of recycled water is anticipated by 2020.

Outside the City's water service area boundaries, there is a project currently pending that will utilize 400 acres of land at the WSWCPF for irrigation of a sports complex. Treated water supply currently utilized on agricultural lands will require tertiary treatment before reallocation to this complex. Upgrade of the treatment process to include tertiary treatment with filtration is expected by the year 2004. The agricultural and industrial reuse of treated water surrounding the WSWPCF does not replace the groundwater pumped by the City but does reduce the amount of groundwater and surface water use in the area. The additional source of treated wastewater offsets part of the demand for groundwater in Lodi and can be viewed as a form of indirect recycling.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the evaluation conducted in this report, the following recommendations are made.

1. While the water supply is adequate to address average years, dry years, and multiple dry years, the groundwater basin is in a general over draft condition. The City should take steps to develop a conjunctive use program to reduce the overall pumping of groundwater.

2. At this time, it does not appear feasible to partially meet water demands in the City's water service area through use of recycled water. The estimated $7.8 million cost of installing pumping facilities and a pipeline to convey recycled water to the service area from the wastewater treatment plant is considered to be expensive at this time compared to the cost of available groundwater. The City should reassess this issue in 5 years and continue to provide recycled water for reuse on lands surrounding the White Slough Water Pollution Control Facility to minimize the amount of groundwater pumping in the region.

3. Continue with current water conservation efforts. Consider implementing the cost effective BMP 5 (Large Landscapes Conservation Programs and Incentives), BMP 9 (CII Conservation), BMP 14 (Residential ULFT), and BMP 4 (Metering of Residential Customers). The City should explore partnering with other utilities and funding opportunities to help implement water conservation BMPs.

4. Track the development of upcoming drinking water standards that may impact the groundwater supply. These standards include arsenic, radon, and the groundwater rule.

5. To maintain groundwater supply capacity, the City should rehabilitate or replace any older water mains and wells as they reach the end of their useful lives.

6. Establish a process to measure water savings resulting from BMP implementation.

7. Establish a process to keep a record of BMP implementation.

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LIST OF ABBREVIATIONS

ac-ft	acre-feet
ac-ft/yr	acre-feet per year
Act	Urban Water Management Act
BMPs	Best Management Practices
BPS	Booster Pump Station
ccf	one hundred cubic feet
cfs	cubic feet per second
CUWCC	California Urban Water Conservation Council
DBCP	Dibromochloropropane
DHS	California Department of Health Services
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EPA	U.S. Environmental Protection Agency
GAC	granulated activated carbon
gpd gal/d	gallons per day
gpm	gallons per minute
GWR	Ground Water Rule
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MSL	mean sea level
mg	Million gallons
mgd	Million gallons per day
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
pCi/l	Pico-Curies per liter
Plan	Urban Water Management Plan
ppm	Parts per million
psi	Pounds per square inch
SDWA	Safe Drinking Water Act
µg/L	micrograms per liter
WSWCPF	White Slough Water Pollution Control Facility

APPENDIX B

2000 Urban Water Management Plan Checklist 1

Checklist Organized According to Water Code Section

Page # In Plan	Section of Law	Location in Worksheets[a]	Items to address
1-1	10620 (d) (2)	Page 2	Coordinate the preparation of its plan with other appropriate agencies, including direct and indirect suppliers, wastewater, groundwater, and planning agencies (refer to Section 10633).
3-4	10631 (a)	Page 3	Provide current and projected population in 5-year increments to 20 years.
2-1		Page 3	Describe the climate and other demographic factors.
4-8	10631 (b)	Page 4	Identify and quantify the existing and planned sources of water available in 5-year increments to 20 years.
4-8	10631 (c)	Page 12	Describe the reliability of the water supply.
4-9		Page 12	Describe the vulnerability of water supply to seasonal or climatic shortage.
4-8		Page 9	Describe average, single dry and multiple dry water year data.
4-8		Page 10	Describe any plans to replace inconsistent water sources.
4-8	10631 (d)	Page 5	Describe opportunities for exchanges or transfers of water on short-term or long-term basis.
3-6	10631 (e) (1)	Page 6 - 8	Quantify past and current water use in 5-year increments to 20 years.
3-10	10631 (e) (2)	Page 6 - 8	Identify projected water uses among water use sectors in 5-year increments to 20 years.
Appx. F	10632 (a)	Page 24	Provide water shortage stages of action, including up to a 50 percent reduction, outlining specific water supply conditions at each stage.
4-8	10632 (b)	Page 11	Provide minimum water supply estimates based on driest three-year historic sequence.
4-9	10632 (c)	Page 22	Provide actions a water supplier will take to prepare for a catastrophe.
Appx. F	10632 (d)	Page 25	Provide mandatory prohibitions.
Appx. F	10632 (e)	Page 27	Provide consumption reduction methods.
Appx. F	10632 (f)	Page 26	Provide penalties or charges.
4-9	10632 (g)	Page 28	Provide an analysis of the impacts on the water supplier revenues and expenditures.
4-9	10632 (g)	Page 29	Provide measures to overcome revenue and expenditure impacts.
Appx. F	10632 (h)	Page 23	Provide a copy of a draft water shortage contingency resolution or ordinance.
4-9	10632 (i)	Page 30	Provide a mechanism for determining actual reductions in water use.

[a] Refers to CA Department of Water Resources Worksheets

Page # In Plan	Section of Law	Location in Worksheets	Items to address
6-1	10633 (a)	Page 13	Describe the wastewater collection and treatment systems in the supplier's service area.
6-1		Page 14	Quantify the amount of wastewater collected and treated in the supplier's service area.
6-2		Page 15, 16	Describe the methods of wastewater disposal in the supplier's service area.
6-4	10633 (b)	Page 15, 16	Describe the type, place, and quantity of recycled water currently used in the supplier's service area.
6-4	10633 (c) (d)	Page 15, 16	Describe and quantify potential uses of recycled water in 5-year increments to 20 years.
6-4		Page 15, 16	Describe the technical and economic feasibility of serving potential recycled water users.
6-4	10633 (e)	Page 17	Describe the actions that may be taken to encourage recycled water use.
6-2		Page 16, 17	Provide the projected acre-feet results of recycled water used per year.
6-4	10633 (f)	Page 18	Provide a plan for optimizing the use of recycled water in the supplier's service area.
6-4		Page 18	Provide actions to facilitate the installation of dual distribution systems and to promote recirculating uses.
4-8	10635 (a)	Page 19 - 21	Provide an assessment of the reliability of the water supplier's water service to its customers during normal, single dry, and multiple dry water years.
7-1		Page 19 - 21	Compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in 5-year increments (refer to 10631 (c)).
7-2		Page 19 - 21	Compare normal, single dry, and multiple dry water year projected water supply sources available to the water supplier with the normal, single dry, multiple dry water year projected water uses (refer to 10631 (c)).
1-2	10642	Page 1	Make plan available for public inspection before its adoption.
1-2		Page 1	Adopt plan as prepared or as modified after the public hearing

Demand Management Measures Checklist

Page #	Section	Items to address
Chapter 5	10631 (f) (1) (A)	Interior and exterior water audits and incentive programs.
Chapter 5	10631 (f) (1) (B)	Plumbing fixture efficiency standards and programs to retrofit less efficient fixtures.
Chapter 5	10631 (f) (1) (C)	Distribution system water audits, leak detection, and repair.
Chapter 5	10631 (f) (1) (D)	Metering with commodity rates for all new connections and retrofit of existing connections.
Chapter 5	10631 (f) (1) (E)	Large landscape water audits and incentives.
Chapter 5	10631 (f) (1) (F)	Landscape water conservation requirements for new and existing commercial, industrial, institutional, governmental, and multifamily developments.
Chapter 5	10631 (f) (1) (G)	Public information.
Chapter 5	10631 (f) (1) (H)	School education.
Chapter 5	10631 (f) (1) (I)	Commercial and industrial water conservation.
Chapter 5	10631 (f) (1) (J)	New commercial and industrial water use review.
Chapter 5	10631 (f) (1) (K)	Conservation pricing for water service and conservation pricing for sewer service, where the urban water supplier also provides sewer service.
Chapter 5	10631 (f) (1) (L)	Landscape water conservation for new and existing single-family homes.
Chapter 5	10631 (f) (1) (M)	Water waste prohibitions.
Chapter 5	10631 (f) (1) (N)	Water conservation coordinator.
Chapter 5	10631 (f) (1) (O)	Financial incentives to encourage water conservation.
Chapter 5	10631 (f) (1) (P)	Ultra-low-flush toilet replacement.

WATER CONSERVATION ORDINANCE

Lodi Municipal Code, Chapter 13.08, Article III.

ste. (Section 13.08.220)

e waste of water is prohibited and any waste shall make the person ject to the provisions of this article.

fined. (Section 13.08.230)

/aste of water" includes but is not limited to the following:

Failure to repair a controllable leak of water;

The watering of lawns, flowerbeds, landscaping, ornamental plants or dens on days or at times other than those allowed in Section 13.08.240 his article;

Washing of sidewalks, driveways, parking areas, tennis courts, patios, ets or other exterior paved areas or buildings except when required to ıove any spillage of substances that may be a danger to public health ;afety;

. Washing with water any motor vehicles, trailers or movable equipment er than with a bucket and rinsing the vehicle or equipment by use of a ıe for not more than three minutes;

Use of a hose without a positive shut off nozzle;

The excess watering of any area so that water flows into a gutter or any inage area for a period exceeding three minutes;

. The unnecessary running of water in any residential, commercial or ustrial establishment onto the floor, pavement, ground or into any drain drainage area, with any equipment or in any way for more than three ıutes;

. Overwatering of lawns or landscapes from November 1 through ɔruary 28, or during or immediately following a rain.

ıtering days/hours. (Section 13.08.240)

. Days. The watering of lawns, flowerbeds, landscaping, ornamental nts or gardens throughout the year shall be allowed as follows:

1. Premises having odd numbered street addresses on Wednesday, Friday and Sunday;
2. Premises having even numbered street addresses on Tuesday, Thursday, and Saturday.

. Hours. Watering of lawns, flowerbeds, landscaping, ornamental plants gardens shall be allowed at any hour except that between May 1 and ptember 30 (inclusive) of each year watering between the hours of 10 ɔ. and 6 p.m. is prohibited

ıforcement procedures. (Section 13.08.250)

Whenever the City becomes aware of a waste of water the City shall tify the person at the premises where the waste of water occurred by livering an Information Sheet. The Information Sheet shall describe the ste of water in order that it be corrected, cured or abated immediately or hin such specified time as the City believes is reasonable under the ɔumstances. In addition, the Information Sheet may be given to any other rson known to the City who is responsible for that waste of water or the rrection thereof and may be delivered to the premises every time a waste water occurs.

B. In the event of a second waste of water within a 12 month period, the City will send a written notice stating the date(s), time(s) and type(s) of water waste to the person who regularly receives the utility bill for the premises where the wasting occurred.

C. In the event of a third waste of water within 12 months of any previous waste of water, a written notice will be mailed assessing a thirty-five dollar charge to be added to the next monthly utility bill.

D. In the event of a fourth waste of water within 12 months of any previous waste of water, a written notice will be mailed assessing a seventy-five dollar charge to be added to the next monthly utility bill.

E. In the event of a fifth or any subsequent waste of water within 12 months of any previous waste of water, a written notice will be mailed assessing a one hundred and fifty dollar charge to be added to the next monthly utility bill. The City may also require the owner or user to pay for the cost of installation of a water meter service as a prerequisite to continuing service. The City may also install a flow restriction device on the water service and require the owner or user to pay for the costs of installation and/or removal.

Strict application (Section 13.08.260)

. If the Public Works Director or a designated representative determines the strict application of any of the provisions of this article may cause undue hardship or public health or safety to suffer, or if other special circumstances exist, the strict application may be waived. Special circumstances would include, but not be limited to: newly planted areas, newly seeded areas, washing down after cement work and pressure washing a building before painting. The decision of the public works director may be appealed to the City Council as described in 13.08.265 of this article.

Appeals. (Section 13.08.270)

If the ruling made by the Public Works Director is unsatisfactory to the person requesting reconsideration, the person may, within twenty days after notification of the City's action, file a written appeal to the City Council. The written appeal shall be heard by the City Council within twenty days from the date of filing. The City Council shall make a final ruling on the appeal within twenty days of the hearing. The Public Works Director's decision, action or determination shall remain in effect during such period of reconsideration except that any charges assessed under this article will be stayed until the City Council has made it's decision.

Violation-Infraction. (Section 13.08.280)

In addition to the enforcement procedures and surcharges set forth in this article, any person who wastes water, as defined in this article, may also be charged with an infraction.

Emergency water conservation-Purpose (Section13.08.290)

The purpose of emergency water conservation is to assist meeting water pressure and/or supply demands when the water system cannot or may not be adequate and the failure to meet such demands may result in harm to the water system and/or jeopardize the health and safety of the public. The Public Works Director or a designated representative shall determine the degree of emergency and determine what additional restrictions of water use or other appropriate actions must be taken to protect the water system and the citizens of Lodi.

PUBLIC WORKS DEPARTMENT
WATER CONSERVATION OFFICE
(209) 333-6829

INFORMATION SHEET

Requirements of the City of Lodi Water Conservation Ordinance

Ordinance Requirements - Water waste includes but is not limited to:

1. Allowing a controllable leak of water to go unrepaired.
2. Watering lawns, flower beds, landscaping, ornamental plants or gardens except on watering days as follows: **Odd**-numbered addresses on Wednesday, Friday and Sunday; **Even**-numbered addresses on Tuesday, Thursday, and Saturday. (WATERING IS NOT ALLOWED ON MONDAYS)
3. Watering lawns, flower beds, landscaping, ornamental plants and gardens between **10 a.m. and 6 p.m. from May 1 through September 30** each year. (WATERING BETWEEN THOSE HOURS IS NOT ALLOWED)
4. Washing down sidewalks, driveways, parking areas, tennis courts, patios, other paved areas or buildings.
5. Washing any motor vehicle, trailer, boat, moveable equipment except with a bucket. A hose shall be used for rinsing only and for not more than three (3) minutes.
6. Use of a hose without a positive shut off nozzle. (NO OPEN HOSES)
7. Allowing excess water to flow into a gutter or any drainage area for longer than three (3) minutes.
8. Overwatering lawns/landscapes, specially from November 1 through February 28, or during and immediately after a rain.

Water Wasting Rates and Enforcement - Education and cooperation is our first goal, but the following enforcement procedures and charges will be followed for water wasting.

-1st Water Waste - City will leave an information sheet describing the waste so that it may be corrected.

-2nd Water Waste*- City will give written notice requiring corrective action. * Within 12 months of a 1st Water Waste

-3rd Water Waste*- City will give written notice, and a $35 charge will be added to the next utility bill. * Within 12 months of a 2nd Water Waste

-4th Water Waste*- City will give written notice, and a $75 charge will be added to the next utility bill. * Within 12 months of a 3rd Water Waste

-5th and Subsequent Water Wastes*- City will give written notice, and a $150 charge will be added to the next utility bill **AND** the City may require a water meter and/or flow restrictor to be installed at the waster's expense.
* Within 12 months of the previous Water Waste

Water saving tips and other Water Conservation Program information:

1. **Before washing down paved areas for public health or safety** (see #4 above) or for any special circumstances **call** the Water Conservation Office at 333-6829 for prior approval.
2. If you need **extra watering due to fertilizer application or for new turf/seeding**, please **first notify the Water Conservation Office** at 333-6829.
3. For lawns with a run-off problem, apply water for a short period of time and then allow enough time for it to soak in before turning the water back on, for example; 5 minutes on, 20 minutes off, 5 minutes on. This will increase the amount of water being absorbed and decrease the amount of water running into the gutter. Consult landscapers/gardeners/nurseries for improving your lawns water absorbing capacity and for other ideas.
4. During and following rain it is not necessary to water lawns and landscaping, and normally from November 1 through February 28, one watering per week or less is more than enough.
5. Regularly replace your back-up batteries in your automatic sprinkler controls to prevent excess watering due to power failures or interruptions.

If you have any questions, need to discuss any violations, would like further information concerning water conservation, or to report water waste, please call the Water Conservation Office at 333-6829.

This is Not a Citation. However, if you have received any previous notice within the last 12 months, a written notice may follow.

See reverse for full Water Conservation Ordinance.

Revised 3/00

REGLAMENTO PARA CONSERVACIÓN DE AGUA
CÓDIGO MUNICIPAL DE LA CIUDAD DE LODI, CAPÍTULO 13.08, ARTÍCULO III

DESPERDICIO (MALGASTO). (Sección 13.08.220)
El desperdicio de agua es prohibido y cualquier desperdicio pondrá a la persona bajo las condiciónes de este articulo.

DEFINICIÓN. (Sección 13.08.230)

"El desperdicio de agua" incluye, pero no está limitado a lo siguiente:

A. El no reparar una gotera de agua que puede ser controlada;

B. El regar céspedes, jardines, plantas de ornamentación, los días y horas fuera de las permitidas en la Sección 13.08.240 de este artículo.

C. El lavar aceras, áreas de estacionamiento, canchas de tenis, calles, edicifios, entradas residenciales y otras áreas pavimentadas, excepto cuando sea necesario lavar un derrame de alguna substancia que pueda ser peligrosa para la salud y la seguridad pública.

D. El lavar vehículos, remolques o equipo movible a no ser con un balde y enjuagar el vehículo o equipo, usando una manguera no por más de tres minutos.

E. El usar una manguera sin un boquerel positivo para cortar agua.

F. El regar demasiado una área haciendo que el agua corra a una cuneta o área de drenaje por más de tres minutos.

G. El dejar correr el agua sin necesidad en un domicilio, establecimiento comercial o industrial, en el pavimento, desagues o áreas de drenaje, con algún equipo o de cualquier otro modo por más de tres minutos.

H. El regar demasiado los céspedes, jardines y plantas de ornamentacion a partir del 1º de Noviembre al 28 de Febrero, durante y después de llover.

DÍAS Y HORAS DE RIEGO. (Sección 13.08.240)
A. Días. El riego de céspedes, jardines y plantas de ornamentación durante el año será permitido como sigue:
1. Propiedades que terminan en números nones (1,3,5,7,9): Miércoles, Viernes y Domingos.
2. Propiedades que terminan en números pares (2,4,6,8,0): Martes, Jueves y Sábados.

B. Horas. El riego de céspedes, jardines y plantas de ornamentación se permite a cualquier hora, excepto a partir del 1º de Mayo hasta el 30 de Septiembre entre las horas de las 10 de la mañana a las 6 de la tarde.

PROCEDIMIENTOS PARA LA EJECUCIÓN. (Sección 13.08.250)
A. Cuando la Ciudad se entere del primer desperdicio de agua, la Municipalidad le dará una hoja con información que contiene en detalle el Articulo III, en el cual se le dará a conocer el tipo de desperdicio ocurrido para que éste sea corregido, remediado o disminuido inmediatamente o dentro de un período especificado, que la Ciudad crea conveniente. La hoja de información también puede ser entregada a cualquier otra persona conocida por la Ciudad que sea responsable por el desperdicio del agua, o también puede ser enviada por correo al domicilio donde tuvo lugar el desperdicio. En caso de que continuen los desperdicios de agua, nuevas notificacions serán enviadas al mismo domicilio.

B. En el caso de un segundo desperdicio de agua durante los mismos 12 meses, la Municipalidad enviará a la persona que regularmente recibe la cuenta de utilidades una nota enumerando fechas y tipos de desperdicios ocurridos.

C. En el caso de un tercer desperdicio de agua dentro de los mismos 12 meses, otra nota será eviada por correo notificándole de un recargo de $35.00 dólares que serán agregados a la cuenta de utilidades del siguiente mes.

D. En el caso de un cuarto desperdicio de agua dentro de los mismos 12 meses, otra nota será enviada por correo notificándole nuevamente de un recargo de $75.00 dólares que serán agregados a la cuenta de utilidades del siguiente mes.

E. En el caso de un quinto o más desperdicios de agua dentro de los mismos 12 meses, otra nota será enviada notificándole de un recargo de $150.00 dólares que serán agregados a la cuenta de utilidades del siguiente mes. La Ciudad también puede requerir que el dueño o el usuario pague el costo de instalar un contador como pre-requesito para continuar el servicio de agua. La Ciudad también podrá instalar una llave para regular el flujo del agua y requerir que el dueño o el usuario pague el costo de instalar o de remover el contador o la llave .

APLICACIÓN ESTRICTA. (Sección 13.08.260)
Si el Director de Obras Públicas o un representante designado determina que la aplicación estricta del artículo III, pueda causar daños a la salud y la seguridad pública, u otra condición especial exista, la aplicación estricta puede ser suspendida temporalmente. Las circunstancias especiales incluirán: pero estarán limitadas a áreas recién sembradas, a lavar después de encementar y de lavar a presión un edificio antes de ser pintado. La decisión del Director de Obras Públicas puede ser apelada al Concilio de la Ciudad como se describe en la sección 13.08.265 de este artículo.

APELACIÓNES. (Sección 13.08.270)
Si la decisión hecha por el Director de Obras Públicas no es satisfactoria a la persona que apelo por la reconsideración, esta persona tiene veinte (20) días después de ser notificado de la decisión del Director, para apelar por escrito al Concilio de la Ciudad. La apelación será revisada por el Concilio dentro de veinte (20) días después la la fecha de registro. El Concilio hará la decisión final de la apelación dentro de veinte (20) días después de la revisión. La acción, decisión o determinación del Director de Obras Públicas, permanecerá en efecto durante el período de reconsideración. Los recargos acumulados serán suspendidos temporalmente hasta que el Concilio de la Ciudad haga su decisión final.

VIOLACIÓN - INFRACCIÓN. (Sección 13.08.280)
Además de los procedimientos para la ejecución y recargos dados a conocer en este artículo, cualquier persona que desperdicie agua, como se define en este artículo, puede también ser acusada de una infracción.

PROPÓSITO DE EMERGENCIA PARA LA CONSERVACIÓN DEL AGUA. (Sección 13.08.290)
El propósito, de emergencia para la conservación del agua es ayudar a mantener la presión del agua y suplir demandas. Cuando el sistema de agua no puede o no es adecuado esto puede causar daños al sistema de agua y poner en peligro la salud y seguridad del público. El Director de Obras Públicas o un representante designado determinará el grado de emergencia y designará cuales restricciónes adicionales serán necesarias para el uso del agua y que acciónes apropiadas deberán ser tomadas para proteger el sistema del agua y a los habitantes de Lodi.

DEPARTAMENTO DE OBRAS PÚBLICASDE
OFICINA DE CONSERVACIÓN DE AGUA OFIC
(209) 333-6829

HOJA DE INFORMACIÓNDE

Requisitos del Reglamento de Conservación del Agua de la Ciudad de Lodi

EQUISITOS DEL REGLAMENTO DE CONSERVACIÓN DEL AGUA - EL DESPERDICIO DEL AGUA INCLUYE PERO NO ESTÁ MITADO A LO SIGUIENTE:

El permitir que una gotera de agua que puede ser controlada siga sin ser reparada.

El regar céspedes, jardines y plantas de ornamentación excepto en los días designados por la Ciudad. Domicilios que terminan en números nones: Miércoles, Viernes y Domingos. Domicilios que terminan en números pares: Martes, Jueves y Sábados.
(NO ES PERMITIDO REGAR LOS LUNES)

El regar céspedes, jardines, y plantas de ornamentación entre las horas de las 10 de la mañana a las 6 de la tarde a partir del 1ro de Mayo hasta el 30 de Septiembre de cada año. (REGAR ENTRE ESAS HORAS NO ES PERMITIDO)

El lavar aceras, áreas de estacionamiento, canchas de tenis, edificios, entradas residenciales, patios y otras áreas pavimentadas.

El lavar vehículos de motor, equipo movible, lanchas y remolques excepto con un balde. Se debe usar una manguera solamente para enjuagar y no por más de tres (3) minutos.

EL usar una manguera sin un boquerel positivo de cortar el agua.

El dejar que el exceso de agua siga corriendo a la cuneta o a una área de drenaje por más de tres (3) minutos.

El regar demasiado los céspedes, jardines y plantas de ornamentación a partir del 1ro de Noviembre al 28 de Febrero, durante y después de llover.

JECUCIÓN Y RECARGOS POR EL DESPERDICIO DEL AGUA - La educación y cooperación es nuestra primera meta. Las siguientes ormas de ejecución y recargos serán aplicados por el desperdicio del agua:

rimer desperdicio de agua - La Ciudad le dará una hoja de información describiendo el desperdicio del agua para que este corregido.

egundo desperdicio de agua* - La Ciudad le enviará una nota requiriendo acción correctiva.

ercer desperdicio de agua* - La Ciudad le enviará una nota y un recargo de $35.00 será agregado a la siguiente cuenta de utilidades.

uarto desperdicio de agua* - La Ciudad le enviará una nota y un recargo de $75.00 será agregado a la siguiente cuenta de utilidades.

Quinto y subsiguientes desperdicios de agua* - La Ciudad le enviará una nota y un recargo de $150.00 será agregado a la siguiente cuenta de utilidades. La Ciudad podrá requerir un contador y una llave para controlar el flujo de agua, que será pagado por el usuario. (*Dentro de los mismos 12 meses).

RECOMENDACIONES PARA EL USO EFICIENTE DE AGUA:

. Antes de lavar áreas pavimentadas por razones de salud o seguridad pública (vea #4 arriba) o por alguna razón especial, llamar a la Oficina de Conservación del Agua al 339-9026 para autorizacion.

2. Los céspedes con problemas de drenaje, deben ser regados por un periodo corto, y esperar que el agua se consuma antes de volver a regar por ejemplo: regar por 5 minutes, no regar por 20 minutes; regar por 5 minutos, no regar por 20 minutes. Regando de esta manera el cesped absorvera más y se disminuirá la desperdicio del agua.

3. Durante y después de llover no es necesario regar los céspedes. A partir del 1ro de Noviembre hasta el 28 de Febrero solamente regar una vez por semana.

SI UD TIENE ALGUNA PREGUNTA, NECESITA HABLAR CON ALGUNA PERSONA ACERCA DE UNA INFRACCIÓN, SI NECESITA MAS INFORMACIÓN ACERCA DE LA CONSERVACIÓN DEL AGUA, O NECESITA INFORMARSE ACERCA DEL DESPERDICIO DEL AGUA, POR FAVOR LLAMAR A LA OFICINA DE CONSERVACIÓN DEL AGUA AL TELEFONO 333-6829.

ESTO NO ES UNA CITACIÓN. PERO SI UD HA RECIBIDO ALGUN OTRO AVISO DENTRO DE LOS ÚLTIMOS 12 MESES, UN AVISO POR ESCRITO LE SERÁ ENVIADO.

(Revised 8/99)

Notice of Violation of Lodi Municipal Code Section 13.8 Article III – Water Conservation

Issued to: ***Copy to:***

Location of Violation:

LODI, CALIFORNIA

First Water Waste – Information Sheet left at location of violation.

_____ *Second Water Waste*[a] *First mailed notice (warning) requiring corrective action.*
(a) Within 12 months of a first waste of water.

_____ *Third Water Waste*[b] *A $35 charge to be added to next utility bill.*
(b) Within 12 months of a second waste of water.

_____ *Fourth Water Waste*[c] *A $75 charge will be added to next utility bill.*
(c) Within 12 months of a third waste of water.

_____ *Fifth Water Waste*[d] *A $150 charge will be added to next utility bill.*
(d) Within 12 months of the previous waste of water. City may also require installation of a water meter and/or water restrictor at the user's expense.

Type(s) of Violations: (includes all **Violations** listed below, current and previous)

_____ 1) *Failure to control a controllable leak*
(If you need help locating the leak, please call the Water Conservation Coordinator at 333-6829.)

_____ 2) *Watering on an unassigned day*

_____ 3) *Watering between 10:00 A.M. & 6:00 P.M. from May 1 thru September 30*

_____ 4) *Washing down sidewalks, paved areas, buildings, etc.*

_____ 5) *Use of a hose without a positive shut off nozzle*

_____ 6) *Flooding gutter or drainage area over three (3) minutes*

_____ 7) *Overwatering, specially from Nov. 1 thru Feb. 28, or during or after rain*

_____ 8) *Other* _____

	Violations		
	Dates	**Time**	**Type(s)**
Current:			
Previous:			

Richard C. Prima, Jr.
Public Works Director

By: _____ Date:
Frank Beeler
Assistant Water/Wastewater Superintendent

Questions? Call the Water Conservation Coordinator at (209) 333-6829
See reverse for more information

Water Conservation Violation Card

Address _____ ☐ Notice

Occupant _____ ☐ Verbal

Owner _____ ☐ Waiver Approved ☐ Denied

Address _____

Apt.☐ Duplex☐ Res.☐ Bus.☐

Date _____ Time _____ A.M./P.M.

- ☐ Controllable Leak
- ☐ Watering Time
- ☐ Watering Day
- ☐ Washing Paved Concrete Area
- ☐ Use Of An Open Hose
- ☐ Washing Equip. or Trailer
- ☐ Flooding Gutter (3 minutes)
- ☐ Other _____

_____

_____

By _____ Dept. _____

— Use reverse side for remarks —

MSC-215 (7-91) AP

Remarks: _____

_____

_____

_____

_____

_____

_____

_____

City of Lodi, Public Works Department

Water/Wastewater Division - Water Conservation

Water Conservation Report Annual Summary

April 1, 2000 through October 31, 2000

The following is the annual summary of water conservation activities for the City of Lodi.

Year (Apr. - Oct.)	Million Gallons *	Population	Gal. Per Capita Per Day**	% change from previous year	Inches Rain	Water Conservation Notices Recorded ***	Patrol Miles	Deputy Hours
1997	4022.4	54,700	285	+5.2 %	1.40	3965	27,489	3449
1998	3578.0	55,681	249	-12.6%	6.84	2625	23,583	3309
1999	4164.7	56,926	284	+13.9 %	1.50	4306	25,463	3503
2000	4171.6	57,935	279	-1.6%	4.43	3198	29,051	3527

* Total water produced for all uses.

** Total gallons minus 17% for industrial/commercial uses, divided by the population and number of days.

*** Does not include the numerous phone calls and undocumented contacts with the citizens of Lodi.

	1997		1998				1999				2000			
	Water Production		Water Production		Rainfall		Water Production		Rainfall		Water Production		Rainfall	
Month	Pro-duction MG/ month	Inches Rain/ month	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Chang e from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Chang e from prev. year	Total MG/ month	% +/- from prev. year	Inches Rain/ month	Chang e from prev. year
Apr	446	0.30	285	-36 %	1.67	+1.37	353	+24 %	0.91	-0.76	437	+24 %	1.18	+0.27
May	546	0.31	314	-42 %	3.67	+3.36	541	+72 %	0.29	-3.38	483	-11 %	0.94	+0.65
Jun	613	0.19	452	-26 %	0.19	+0.00	589	+30 %	0.00	-0.19	658	+12 %	0.04	+0.04
Jul	715	0.00	710	-1 %	0.00	+0.00	695	-2 %	0.00	+0.00	738	+6 %	0.03	+0.03
Aug	711	0.09	745	+5 %	0.00	-0.09	783	+5 %	0.00	+0.00	791	+0.9 %	0.08	+0.08
Sep	574	0.00	661	+15 %	0.08	+0.08	689	+4 %	0.08	+0.00	688	-0.2 %	0.00	-0.08
Oct	417	0.51	410	-2 %	1.23	+0.72	514	+25 %	0.22	-1.01	377	-27 %	2.16	+1.94
TOT.	4022	1.40	3578	-11%	6.84	+80%	4165	+16 %	1.50	-78%	4172	0.2%	4.43	+95%

Water Contact Categories	Notice Only	Both Notice & Verbal
Controllable Leak	1131	596
Watering Day	92	51
Watering Time	379	384
Washing Paved Areas	22	111
Use of Open Hose	70	119
Gutter Flooding	136	89
Other	5	0
Overwatering	0	13
Subtotals	1835	1363
Total	3198	

Water Conservation Notices Mailed	Number of Notices	Assessment per Notice	Total Assessments*
2nd Notices	301	none	na
3rd Notices	10	$ 35.00	$ 350.00
4th Notices	1	$ 75.00	$ 75.00
5th Notices	0	$ 150.00	$ 0.00
Totals	312		$ 425.00

*Total amount assessed through notices, not total amount collected.

Total Mailed Notices for Previous Years:	2000	1999	1998	1997
	312	192	109	294

Water Conservation Education Activities:

Due to illness and sudden passing of Orson Laam the Water Conservation Coordinator, no education activities were conducted in this period of time.

CITY OF LODI, PUBLIC WORKS DEPARTMENT
Water/Wastewater Division
Municipal Service Center
1331 South Ham Lane, Lodi, CA 95242
(209) 333-6740

Water Conservation Education Program
Prepared by: George Sande, Water Conservation Officer
Frank Beeler, Assistant Water/Wastewater Superintendent

THE CLASSROOM

Philosophy

Using a gut-level hands-on approach that is stimulating to the class is a prerequisite to accomplishing the objectives to teaching "Water Science" in the classroom. It must be pertinent and challenge their imagination.

My previous teaching experience has been at the secondary level. I believe the elementary level is far more cost effective when considering lifetime attitudes, values and habits being molded and established in the most formative period of their lives.

Objective

Instill water awareness and interest particularly among students in grade levels K thru 6, and the application of this awareness be utilized in all aspects of water conservation. This is accomplished by short lectures with students participating and with several "magic" water shows/experiments that they are challenged to guess results and to do at home.

Procedure

The preparation of materials necessary for the particular grade level must first be selected and organized for presentation. The materials for the water experiments can be very simple in that nearly all the ingredients may be found in the kitchen and most of the materials can be collected from garbage cans.

This equipment is organized and put into a cardboard box. A two-wheeled cart is a convenience for wheeling from class to class.

An overhead projector is a must if a transparency is being used. It is also important when showing water in a medicine dropper, objects floating on water (seen through a glass plate).

Always arrange to be in the classroom at least five or ten minutes early to set up and make observations. It is important to observe student displays on bulletin boards in the classroom and even in the hallways because often their ideas and current projects on display can be worked into the water presentation.

Also, if you can initially impress them with your observations of their activities they are better conditioned to be receptive to your demonstrations.

The initial introduction for a presentation usually includes distribution of book markers and an OUR WATER brochure. The book marker has an anti-drug message on one side and a water conservation message on the other. This presents an opportunity to reiterate the anti-drug message and present the City of Lodi message concerning WATER IS LIFE, DON'T WASTE IT. Then the brochure is briefly discussed. The students are asked to identify familiar objects and landmarks shown on the front page. Then they are asked to take the brochure home and maybe play the same game with their parents, brothers, sisters, or even friends. It is suggested they encourage their parents to read the information on the other three pages.

The teacher is given a yard/meter stick for class use. The water conservation logos imprinted on this ruler is briefly discussed.

Teaching

My presentation always varies in some way, but basically I think it is best to establish enthusiasm by indicating I play the part of a magician in performing water tricks. At the same time, they are informed that there will be no charge for the performance and all the secrets will be revealed. At this point they are encouraged to perform at least one of the tricks for their parents, brother, sister or friend.

Since enthusiasm is so vital for group participation, I constantly ask questions to see if they can predict the outcome of each experiment explaining that no one is "wrong" until after they can see the conclusive proof before their eyes.

One of my favorite lessons is to teach OSMOSIS by using an egg, potato or fish. If it is a fourth grade class, I use all three. (These lessons are enclosed)

The message I try to convey is that the water conservation program is THEIR program. This is where the gut-level approach is emphasized. By a raise of hands, I have found that about 90% of elementary students have pets. A simple reminder that if we didn't have water, all their pets would be dead--is a sobering thought for all. Another example: By displaying a cross section of a tree and showing them the tree rings which indicates the age of a tree as well as dry and wet years is a documentation of drought periods. Such documentation has shown on very old trees that from the year 1620 to 1671 there was a fifty year period of consecutive drought years. They listen when you suggest the possibility of this happening in their life time.

Of course such dramatic facts and methods will vary with the level of the class I am teaching.

Teachers are invariably receptive and interested in the presentations and nearly always do follow-up on some aspect of what I did in their particular class. Many use the experience as a language arts assignment and I have received literally hundreds of letters from students or packets of students' art work along with their letters. The letters are particularly revealing to me in that they indicate their perceptions, interests, and understanding.

Even though I feel well prepared and organized when presenting a lesson, I have found there is always room for spontaneity and adapting to unique differences in classes. I think this philosophy is important because a fresh approach will always help prevent one from giving a stale presentation.

SETTING UP THE PROGRAM

Most of my organizational methods were learned by trial and error. Due to constant changes occurring in some schools, I feel the following approach is the best way. You will also find each school is unique in itself.

Normally, I meet with one of the principals (depending which one decides to be in charge). I then discuss the basics of our whole water conservation program. At this time I also arrange to meet with all the teachers at the next Principal-Teacher meeting. At this meeting I explain what I do in the classroom and briefly outline the objectives of our educational program. This meeting also gives them a chance to ask questions.

Initially I introduce my calendar. It is enlarged so that each teacher can sign up for a class by indicating their name, grade level, time and room number in the chosen open date block. This calendar is then posted in the teachers lounge room for continued scheduling in advance.

It is best to have the teachers sign up at the meeting when the calendar is being passed around during the time I am talking to them--about 10 or 15 minutes. It also insures their understanding of the sign up procedure.

Periodically, I check all calendars which have been posted even if there have been no classes in the school. New sign-ups are logged in my master calendar appointment book. At this time I leave a City Action Slip notice in the teacher's mailbox confirming the requested class. My business card is attached to the calendars so that the teachers can phone me in case of cancellation or changing schedule.

When checking calendars it is beneficial if you can arrange to do so during a time when several teachers are in the lounge room. Invariably, teachers tend to sign up when they see me in the lounge room or somewhere on the campus. Calendars are checked

when I give a demonstration at that particular school, but it is important to check each school at least once a week.

EXTRACURRICULAR ACTIVITIES

In order to enhance, expand and further support the educational aspects other innovations come into play such as:

1. Evening classes for Boy Scout/Girl Scout troops.

2. Speaking to the Rotary, Kiwanis, Business Mens' Club and ATT employees, etc.

3. The city co-sponsored a water conservation workshop held at UOP in Stockton. Eighty eight teachers attended this workshop.

4. Newspaper stories.

5. As a Docent, I have conducted tours in the Wilderness Area surrounding Lodi Lake. Class discussion is held at the outdoor amphitheater.

6. Posters: I send letters to all teachers who have participated in a classroom demonstration with an invitation to submit a class poster. The poster, 28" X 44", is provided by the city. The California Department of Water Resources has declared the month of May as Water Awareness Month and we have been able to cooperate with their efforts in this way. This year I picked up 46 posters from classrooms which were distributed to banks, hospitals, City Hall, restaurants, and other business establishments. Teachers were informed of the location of their class poster so that parents and students might see the exhibit. All participating officials receiving the poster were very receptive to the idea.

7. Fair Booth: The most beneficial factor with having a Fair Booth at our local festival is for drawing the attention of teachers who may sign up for a class. They need only designate the month they want a class. I call them later for confirmation of specific day and time.

We are all very interested in anyone planning a similar water conservation program and the City of Lodi will assist in any way possible to initiate and establish this vital program that should no longer be ignored.

MATERIALS

1.	AIMS Newsletter-AIMS Education Foundation P.O. Box 7766 Fresno, CA 93747	See enclosed samples.
2.	California Department of Water Resources (DWR) Office of Public Information and Communication Room 1104-1, Resources Bldg 1416 Ninth Street Sacramento, CA 95814 Telephone: ATSS 8-473-5839	Water conservation ideas and tips. Listings of their publications, techniques DWR NEWS.
3.	American Water Works Association (AWWA) Information Service 6666 West Quincy Avenue Denver, Colorado 80235 (303) 794-7711	Water conservation info. charts, articles on tours, drought, award campaigns (water awareness month promotion).
4.	ADCO Specialties Catalog 1924 Pacific Avenue Stockton, CA 95204 (209) 467-0433	Pens, calendars, rulers, flags, bookmarkers, slogans, emblems, keys, novelties, badges, pictorial illustrations
5.	Walter W. Cribbins Company 562 Mission Street San Francisco, CA 94105 (415) 543-4153	Conservation Materials, Slogans, pictures
6.	Discovery Toys Kathy Bell Educational Consultant 335 Louie Avenue Lodi, CA 95240 (209) 369-7708	Educational toys for K-6, clay, paints, blocks, gifts, creative units, puzzles, jig saw, magnets, mirrors, fish, simple experiments.

MATERIAL SUPPLIERS (CONT.)

7.	East Bay Municipal Utilities Department (EBMUD) Public Information P.O. Box 24055 Oakland, CA 94623 (415) 891-0609	Field trips, charts, maps, requested local information, fishery, reservoirs, brochure on water-health, pamphlets.
8.	Stockton Blue Reprographics Supplies 1421 North El Dorado Stockton, CA 95202 (209) 464-6012	Custom designing prints, vellum, copies. Our slogan and illustration was reproduced (enlarged) by them.
9.	Informational Booklets Channing L. Bete Company Inc. 200 State Road South Deerfield, MA 01373	Booklets pertaining to all aspects of conservation; water treatment, etc.

CITY OF LODI

COUNCIL COMMUNICATION

AGENDA TITLE: Approve the Joint Powers Agreement for the Northeastern San Joaquin County Groundwater Banking Authority, Appoint a Representative and Two Alternates to that Board, and Provide Policy Direction Regarding Participation in Successor Entity to East San Joaquin Parties Water Authority for Future Surface Water Supplies

MEETING DATE: February 7, 2001

PREPARED BY: Public Works Director

RECOMMENDED ACTION: That the City Council approve the joint powers agreement for the Northeastern San Joaquin County Groundwater Banking Authority, appoint a representative and two alternates to that Board, and provide policy direction regarding participation in successor entity to East San Joaquin Parties Water Authority for future surface water supplies.

BACKGROUND INFORMATION: On October 17, 2000, City staff briefed the City Council on water supply activities including our membership in the East San Joaquin Parties Water Authority (ESJPWA) and discussions with North San Joaquin Water Conservation District (NSJWCD) and East Bay Municipal Utilities District (EBMUD) on possible conjunctive-use water supply projects. The Council concurred in the direction that was described. A copy of the report from that meeting is attached (Exhibit A).

Staff has continued to work on these items, however, a recent development has initiated a sense of urgency. EBMUD, Sacramento interests, and the Bureau of Reclamation have resolved many issues regarding diversion of American River water to EBMUD via a pipeline from Sacramento to the EBMUD aqueducts in San Joaquin County. (See Exhibit B for map and MOU.) The opportunity to participate in this project is one that we and others in the County should not pass up; however, the time frame is extremely short, as stated in the letter from the project partners to San Joaquin County (Exhibit C).

Since the ESJPWA agreement has expired, a new entity is needed to step up and take the lead in representing interested parties. Management staff from the ESJPWA members met to discuss a new entity and have drafted a new Joint Powers Agreement (Exhibit D). The organization's purpose and goals are stated in Article I. Given the accelerated time frame, the other agencies are all considering this document in early February, in order to receive final approval from the Board of Supervisors by late February. The name of the organization has been changed to more accurately reflect the geographical area represented and the purpose of the organization.

The agreement provides for a representative from the City of Lodi plus two alternates. Two alternates were recommended to help insure participation since a unanimous vote is required for any action. In the past, the Board member was a member of the City Council and the alternate was the

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APPROVED: _____

H. Dixon Flynn -- City Manager

Public Works Director. Staff feels that this is appropriate. The second alternate could be either another Councilmember, City staff member, or someone from the public. The main qualifications would be a keen interest in water issues and the time to attend what is likely to be a high number of meetings in the next few months.

In terms of policy direction, those described in Exhibit A are still generally valid from staff's prospective; however, they are out-of-date given the latest developments in Sacramento County. The projects described in Exhibit A are certainly lower in priority for EBMUD when compared to the Freeport project. Also, it is very possible that unless the facility is oversized, there will only be a relatively small amount of water available for San Joaquin County. Oversizing the project will take a significant effort on the part of this County – an effort that will mean spending a substantial amount of money in a short time frame. And EBMUD has made it clear they want their project to move forward quickly.

In terms of policy direction, staff feels that the City of Lodi should be prepared to speak up for roughly 15,000 to 25,000 acre-feet of water, at least in wet years. This will mean spending some money, both in participating in the legal negotiations over project agreements and in preliminary engineering to examine alternatives. These costs are unknown at this time, but could easily be in the six-figure range. Our use of the water in the very long term would be to reduce our own use of groundwater. In the short term, the water could be used for groundwater recharge or provided to other users to reduce groundwater pumping. This policy direction would include continuing to move forward absent other members of the JPA, if necessary.

Again, this is only policy direction at this point. No financial commitment is needed today. The County is nearing completion of the county-wide Water Management Plan which will provide additional background information to help in making a decision at a later date. Also, the City's Urban Water Management Plan is nearing completion and will be available for public and Council review in a few weeks.

Staff will have additional information at the Council meeting on the 7th.

FUNDING: None needed at this time.

Richard C. Prima, Jr.
Public Works Director

RCP/pmf

Attachments

cc: Jack Sieglock, San Joaquin County Board of Supervisors
Ed Steffani, North San Joaquin Water Conservation District
Andy Christensen, Woodbridge Irrigation District
Manuel Lopez, San Joaquin County Public Works Director
Morris Allen, City of Stockton, Water/Wastewater Director
Kevin Kaufman, Stockton East Water District, General Manager
Reed Roberts, Central San Joaquin Water Conservation District
Anthony Saracino
Mark Williamson, East Bay Municipal Utility District
Fran Forkas, Water/Wastewater Superintendent

CITY OF LODI

COUNCIL COMMUNICATION

AGENDA TITLE: Update on Water Supply Issues

MEETING DATE: October 17, 2000 (Shirtsleeve Session)

PREPARED BY: Public Works Director

RECOMMENDED ACTION: None – information only.

BACKGROUND INFORMATION: Following previous Council direction, City staff has, 1) continued to work within its membership in the East San Joaquin Parties Water Authority (ESJPWA), and 2) held discussions with North San Joaquin Water Conservation District (NSJWCD) and East Bay Municipal Utilities District (EBMUD) on possible conjunctive-use water supply projects. The purpose of this meeting is to update the Council and the public on these activities and describe upcoming activities.

The fundamental element of a conjunctive-use project is that excess surface water supplied from one entity would either be stored in the local groundwater basin, or provided as additional surface water replacing present groundwater use by a local entity, and then, in a drought, the "stored" groundwater would be available to the supplying entity. While the concept sounds simple, issues surrounding the details, both legal and technical, are complex and controversial in some minds. These issues are being addressed as described below and our planned policy direction is shown in italics:

- ESJPWA – This entity has served as a forum for local urban and agricultural water suppliers and users, including EBMUD, to continue discussions and plan for future projects. ESJPWA has confirmed its role as a planning authority and has formally stated that any specific projects are to be undertaken by individuals or groups of members. The ESJPWA has continued the Beckman Test Project to learn more about the fate of injected water into the groundwater basin to assist members in planning a larger scale project.

  We intend to continue this participation and strongly agree that actual projects would be best handled by the ESJPWA's members.

- San Joaquin Water Advisory Commission – This countywide commission is currently considering one element related to implementing the recently revised County groundwater export ordinance. That element has to do with possible amendments to State law regarding groundwater export. A memorandum describing possible amendments has been drafted by legal counsel and is attached as Exhibit A.

  Without getting into the myriad of details, we intend to support changes that simplify and make conjunctive-use projects more likely to be implemented while allowing for a reasonable degree of local control.

APPROVED: _____

H. Dixon Flynn -- City Manager

10/11/00

Integrated Storage Investigations and Countywide Groundwater/Surface Water Management Plan – This ambitious and important study is a joint effort among the County, State and local water agencies to develop a comprehensive water supply plan for San Joaquin County. The effort is being assisted by a large steering committee in which we participate. A "Principles of Participation" statement is attached as Exhibit B. One outcome of this work will be an updated computer model of the groundwater basin, which includes surface water flow and use impacts. But the key outcome is a preferred alternative consisting of a package of options, including projects, programs, policies and/or operational strategies that offer a means for achieving plan objectives (see Exhibit C).

We intend to continue participation in this effort and work toward including conjunctive-use, conservation, and recycling as potential elements of the Plan.

- Potential project with Lodi and NSJWCD and/or EBMUD – Following ESJPWA's direction that members actually implement projects, and past Council direction, staff has continued to work on a possible project, focusing on what was formerly called the "10-well project". The updated project concept is attached as Exhibit D and would mainly involve EBMUD and NSJWCD. The concept includes two elements that have led City staff to suggest that additional elements (and City participation) be considered. One element is the concern over pumping wells within the agricultural areas for export – that the increased pumping during a dry year could have an adverse impact on adjacent ag wells. The other element is that the exported water will need to be filtered to remove potential contaminants, mainly DBCP. Of the $25 million budget, nearly half is for filters.

  The additional elements suggested would include the City as part of the project by using excess (off-peak) capacity in our wells as all or part of the export wells, thereby minimizing the impact to agricultural areas. The next element would include the City as one of the conjunctive users. The City would use some surface water when it is available, thereby "banking" groundwater for export in dry years. There are numerous feasibility and technical details to consider, as well as legal/institutional ones to work out on these elements. An updated conceptual outline is attached (Exhibit E).

  Staff intends to continue to work with NSJWCD and EMBUD on this project, including the additional elements, and develop a scope of work for a study to address these details. This will be brought back to the Council in the future for discussion and action. We also intend to continue to work with NSJWCD in its efforts to secure surface water for direct use and/or recharge.

FUNDING: None needed at this time.

Richard C. Prima, Jr.
Public Works Director

RCP/lm

Attachments

cc: Fran Forkas, Water/Wastewater Superintendent
Ed Steffani, North San Joaquin Water Conservation District
Anthony Saracino, East San Joaquin Parties Water Authority
Mark Williamson, East Bay Municipal Utility District
Andy Christensen, Woodbridge Irrigation District
Jack Sieglock, San Joaquin Board of Supervisors
Bob Johnson, Water Advisory Commission Representative

EXHIBIT B

inciples of Participation

San Joaquin County Water Management Plan

JECT SCOPE

lopment of the San Joaquin County Water Management Plan comprises several major tasks, all conducted in the framework of an open process of on-going stakeholder involvement:

- Collection and review of available data and studies related to San Joaquin County Water Resources;
- Development of objectives and criteria for evaluation of various "packages" of water management options including projects, programs and operational strategies (alternatives);
- Development of technically feasible water management alternatives;
- Evaluation of the alternatives according to stakeholder objectives and criteria; and
- Recommendation of a preferred alternative to the County Board for consideration;
- Development of a countywide water management plan document based on the selected alternative; and
- Development of financing and implementation plan documents.

achieve these goals, the project team is asking stakeholder workshop participants to:

1. Learn about countywide water management issues and the respective roles of the San Joaquin County Flood Control and Water Conservation District, its consultants, local water agencies and regulating agencies in this effort.

2. Become familiar with the decision making process used by the San Joaquin County Flood Control and Water Conservation District.

3. Use the meetings as a forum for each organization/community representative to work cooperatively, to consider a range of options, and to communicate specific concerns to other participants and the project team.

4. Report back to constituents and organizational colleagues on the goals and progress of the planning effort.

5. Provide input to the project team on stakeholder objectives, concerns, and values that it should consider in making its decision. Work hard to assure that all participants' concerns have been documented.

6. Make an effort to reach a consensus with other participants, where possible.

7. Attend the series of _____ currently planned workshops; and

8. Listen courteously to other points of view and consider alternatives before making recommendations.

Principles of Participation – p.2

DISCUSSION PROCESS

All stakeholder perspectives are valued. The preferred deliberation process is collaborative problem solving. In the cases of non-consensus, all viewpoints will be documented and communicated to decision-makers.

SUPPORT

A neutral facilitator, as well as the San Joaquin County Flood Control and Water Conservation District staff and consultants, will provide technical information and assistance to participants during discussions.

AGENDA AND TIMETABLE

Participation in the establishment of agendas and matters for discussion will be encouraged. The facilitator will be responsible for preparing the agendas in collaboration with participants. At the conclusion of each meeting, staff will recommend items for inclusion in the next agenda.

MEETING RECORDING

Meetings will be audio taped to assist in the preparation of meeting summaries that will be distributed to participants.

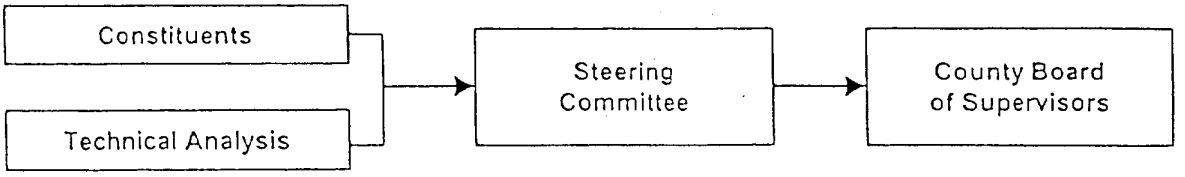
SUMMARY MEMORANDUM

A summary memorandum containing participants recommendations will be prepared for consideration by the County Board when selecting an alternative to be developed into the Management Plan. It is suggested that this summary memorandum contain the following:

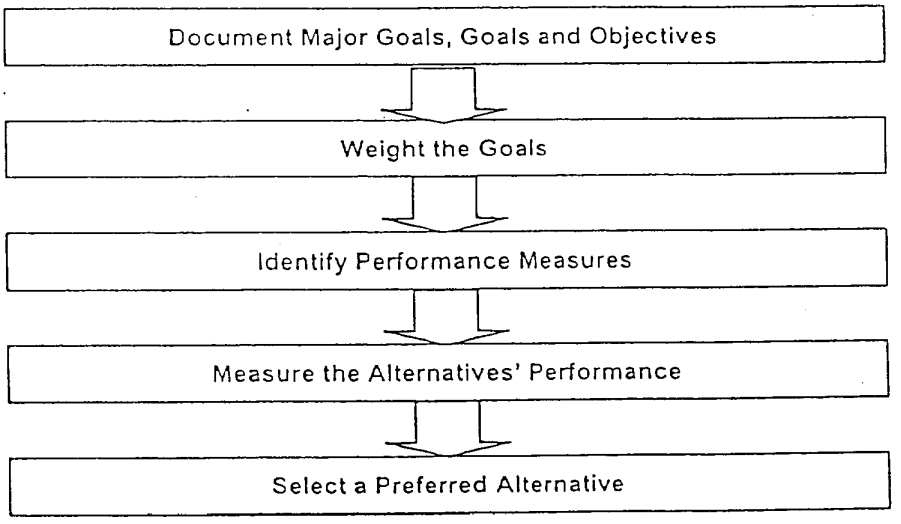
- The scope and content of the discussions;
- Recommendations and conclusions on the issues considered; and
- Individual opinions and observations that may not be reflected in the main body of the Water Management Plan document or implementation plan.

EXHIBIT C

Decision-Making on the Final Plan



Steering Committee Decision-Making Process



Some Definitions

- Option: *A project, program, or policy or operational strategy that offers a means for achieving plan objectives*
- Alternative: *A package of options*
- Major Goals: *The essential goals in developing a plan, in broad, overarching terms*
- Goals: *Further elaboration on/explanation of the major goals*
- Objectives: *Detailed breakdown describing the goals*
- Performance Measures: *Indicators or indices of the degree to which water management alternatives meets the objectives*

EXHIBIT D

EAST SAN JOAQUIN PARTIES WATER AUTHORITY

Central San Joaquin WCD
City of Lodi
Woodbridge Irrigation District
California Water Service Co.

San Joaquin County
Stockton East Water District
City of Stockton
N. San Joaquin WCD

Anthony M. Saracino
Executive Director/Secretary
(916) 329-9199

555 Capitol Mall, Ste. 1550
Sacramento, CA 95814

Groundwater Banking Project Concept

1) Project name
   a. Eastern San Joaquin County Groundwater Bank No.1
2) Project goals
   a. Increase local water supply reliability, reduce overdraft, and provide dry year benefits for project partner
3) Project participants
   a. ESJPWA or subset of member agencies and EBMUD for Bank No. 1
   b. Other potential partners for Bank No. 2, 3, etc.
4) Bank No. 1 Project location
   a. Project will be bounded by Mokelumne River to the north, Highway 99 to the west, 8-mile road to the south, and Jack Tone Road to the east
5) Project scope
   a. In lieu and injection components
   b. Mokelumne River water to NSJWCD
   c. Three extraction wells south of Mokelumne River
   d. Seven injection/extraction wells near aqueduct
   e. Average annual recharge: 7,000 acre-feet
   f. Average annual extraction: 3,500 acre-feet
6) Project costs
   a. Approximately $25 million
7) Project schedule
   a. Develop project design
   b. Public outreach and education
   c. Preparation of application under Groundwater Ordinance

EXHIBIT E

September 2000

CONCEPTUAL OUTLINE
GROUNDWATER STORAGE/CONJUNCTIVE USE PROJECT
NORTH SAN JOAQUIN WATER CONSERVATION DISTRICT
CITY OF LODI
EAST BAY MUNICIPAL UTILITY DISTRICT

OBJECTIVES

- Develop a consensus understanding of the groundwater system south of the Mokelumne River and north of the Mokelumne Aqueducts
- Develop a comprehensive community outreach and education program to ensure the public is informed and their concerns fully addressed
- Develop a groundwater banking project which:
  - provides a net benefit to North San Joaquin Water Conservation District (NSJWCD) and City of Lodi (City)
  - provides a net benefit to East Bay Municipal Utility District (EBMUD)
  - fully protects the overlying land uses, including the right to utilize groundwater
  - fully protects all water rights and entitlements

BENEFITS

- Benefits sought by NSJWCD:
  - net recharge to groundwater basin
  - provide incentive for NSJWCD water users to utilize NSJWCD surface water supplies
  - increase firm supply to NSJWCD water users
  - upgraded water conveyance systems
- Benefits sought by City of Lodi:
  - net recharge to groundwater basin
  - access to future surface water supply via surface water treatment plant
  - revenue stream through potential use of City wells and treatment works
- Benefits sought by EBMUD:
  - groundwater storage of wet year entitlements to allow dry year extractions
  - high quality supplemental water source

LANDOWNER PROTECTIONS

- Community outreach program
- Involvement of Chamber of Commerce, Farm Bureau, and other organized groups
- Formation of a Community Advisory Task Force
- Monitoring well network
- Willing landowners
- County Groundwater Export Permit applied for jointly
- NSJWCD/Lodi/EBMUD operating agreement/contractual guarantees
- Monitoring Committee

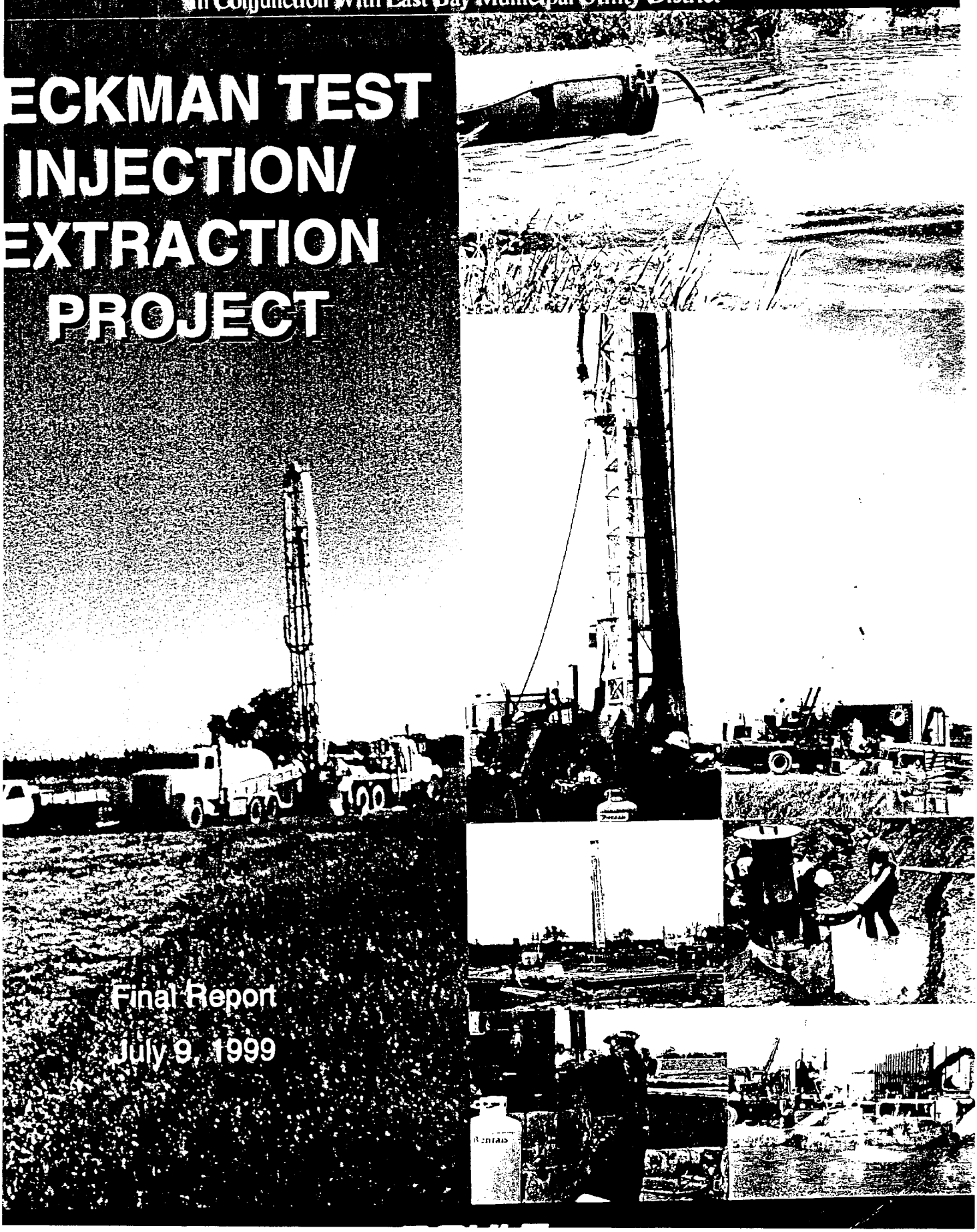
KEY SUCCESS MILESTONES

- 2x2x2 elected officials meetings
- Cooperative agreement for exploration, engineering feasibility and alternatives development
- Public outreach/Community Advisory Task Force
- Exploration program

- Formation of Joint Powers Authority (or other arrangement) for project
- Monitoring well network
- Inclusion in County Water Plan
- Water Code 1220 and 1011.5 modifications
- Project engineering
- Environmental documentation
- Groundwater Export Permit
- Project construction
- Project operation/recharge starts

East San Joaquin Parties Water Authority
In Conjunction With East Bay Municipal Utility District

ECKMAN TEST INJECTION/ EXTRACTION PROJECT



Final Report

July 9, 1999

Executive Summary
Beckman Test I/E Project

The Beckman Test Injection/Extraction Project (Project) was proposed by the East San Joaquin Parties Water Authority (ESJPWA) in conjunction with the East Bay Municipal Utility District (EBMUD) to confirm that injection of Mokelumne River Aqueducts (MRA) water via injection wells could be accomplished. The injection wells pursuant to previous project proposals were anticipated to have a capacity of 1,000 gpm in extraction and 500 gpm during injection.

The ESJPWA consists of the North San Joaquin Water Conservation District, City of Lodi, Woodbridge Irrigation District, Stockton East Water District, City of Stockton, Central San Joaquin Water Conservation District, San Joaquin County and California Water Service Company, a water purveyor in the City of Stockton. These parties provided the funding for the project while EBMUD provided the water supply from its MRA.

The Project was sited based on its proximity to the MRA. The Project is located approximately one mile east of the intersection of the MRA and State Highway 88, just south of Live Oak Road. This site has groundwater conditions similar to many other areas of the ESJPWA service area wherein the water table slope is fairly flat. A statement of Project goals is contained in the Memorandum of Agreement (MOA) between the ESJPWA and EBMUD. A copy of the MOA is included in Appendix A.

The Project was designed and constructed in late fall 1997 and was operational January 12, 1998. Due to the very high levels of precipitation, both rain and snow in the mountains, the runoff in the rivers serving the MRA system was very high (third largest in history). This created turbidity in the MRA reservoir system, specifically Pardee Reservoir. As a result, the turbidity limits set by ESJPWA for injection were occasionally exceeded. Therefore, operations were curtailed from time to time throughout the early part of the Project. Operation of the injection well and its monitoring well took place from January 12, 1998 (first day of activation) through the termination of the availability of water supply by EBMUD on September 23, 1998.

Injection rates during the period ranged from a low of 500 gpm to as high as 1,500 gpm. The rates of injection were held constant over various periods of time to determine the ability of the aquifer to accept

water on a continuous basis over a long period of time. This was important because one of the project goals was to be able to use the data collected to develop design criteria for a subsequent project. Approximately 107 million gallons (328 acre-feet) of water were injected as part of the Project. Approximately 2.9 million gallons (8.9 acre-feet) of water were extracted.

All injection well projects experience well plugging (reduction in injection rate capability) as a result of injection. Another goal of this Project was to confirm that injection of untreated MRA water could take place and the well could be rehabilitated after plugging occurred to allow injection to continue. This was demonstrated during the Project and at Project's end the injection rate capability of the system was equivalent to that which was experienced at the beginning of injection.

As a result of data developed during the test program it was possible to develop an empirical formula for the plugging of the formation. The variables in the formula are volume of injected water and its turbidity and a modified value of specific injection (injection rate divided by drawup). This plugging formula will help predict the time between rehabilitation efforts for future project injection wells.

Biological growth and chemical reactions, in addition to turbidity, can affect the rate of plugging experienced with injection wells. This Project did not include the evaluation of biological growth or chemical reactions. However, neither was considered to be highly likely due to several factors. Since the water had chlorine residual at the time of injection, biological growth was not anticipated. The downhole video, taken during the later part of project operations, did not show any evidence of biological growth or crustations due to chemical reactions.

The migration of water within the basin subsequent to injection is a factor that is of great interest to the project participants and local landowners. However, due to monetary limitations, the evaluation of the long-term movement of water was beyond the scope of this test program.

The basic conclusions drawn from the Beckman Test I/E Project are as follows:

- Direct recharge by injection of the MRA water is possible.

- During injection, a drawup or mounding of the local groundwater level was experienced. However, this mounding dissipated within minutes after injection was ceased. This indicates that the aquifer readily accepted the injection water.

- Wells with a capacity of 1,000 gpm in extraction and 500 gpm or more in injection appear to be feasible provided the well is properly designed and the aquifer is similar to that used for this Project.

- The plugging of the formation as a result of turbidity in the water appears to follow a pattern that can be mathematically simulated.

- Injection wells can provide for a quick turnaround from injection to extraction with minimal effort if the injection/extraction well is properly designed. The well should be designed so that the injection water is introduced into the well casing below the pump bowls. Tubes mounted on the exterior of the casing should be used to convey the injection water from the ground surface to the point of injection.

- Initial indications are that the injected water can be extracted with little degradation in water quality.

- Additional testing is necessary over a longer period of time to confirm extraction characteristics and direction and rate of movement of the injected water in the formation.

City of Lodi

Table E-1a. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 1 – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Description: Conduct water surveys that include both indoor and outdoor components. Provide recommendations and install plumbing retrofit devices where needed.

Assumptions:

1. The implementation schedule is assumed to be as defined for agencies signing the MOU in the year 2001.

2. Number of surveys necessary to complete is 5% of the baseline number of housing units in 2001. 15% of single-family units and 15% of multi-family units will be surveyed within 10 years of the date implementation is to commence. Surveys will be conducted according to the following schedule: 1.5% by end of the first reporting period, 3.6% by end of second reporting period, 6.3% by end of third reporting period, 9.6% by end of fourth reporting period, and 15% by end of the fifth reporting period.

MOU, page 16 and page 17 Section E.d. California legislation requires that plumbing fixtures manufactured, sold or installed after early 1992 be low-water-use fixtures. Therefore, the greatest water savings can be achieved in pre-1992 homes.

3. Single-family water usage = 450 gpd/unit (59% is outdoor use)

Single-family water usage was calculated based on estimated single family water use and single-family households. The average monthly indoor water use is assumed to be equivalent to the average of 90 percent of the total water used in the lowest water use month in 1991, 1994, 1997, 1998, and 1999. Outdoor water is calculated as the difference between annual total use and the assumed annual indoor water use.

4. Multi-family water usage = 200 gpd/unit (27% is outdoor use)

Multi-family water usage was calculated based on historical multi-family water use and multi-family households. The average monthly indoor water use is assumed to be equivalent to the average of 90 percent of the total water used in the lowest water use month in 1991, 1994, 1997, 1998, and 1999. Outdoor water is calculated as the difference between annual total use and the assumed annual indoor water use.

5. Water savings from indoor leak detection, not including toilet leaks = 0.5 gpd per residence

A & N Technical Services report (2000, page 2-20) (12.4 gpd per household repair; 4 percent of households audited have leaks).

6. Water surveys decrease outdoor water use by 10%

MOU estimate is 10% (page 17).

7. Each water survey costs $50

It is assumed that this BMP is done in conjunction with BMP 2.

8. The life span of a water survey is four years.

A & N Technical Services report (2000, page 2-20) gives life spans for various components of a water survey. Four years was selected as a reasonable average value based on that information.

9. Water savings from indoor plumbing retrofits are tracked under BMP 2. Only water savings from a decrease in outdoor water use and water savings from indoor leak detection are tracked in BMP 1 to avoid double counting of water savings.

Table E-1b. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 4 – Metering With Commodity Rates for all New Connections and Retrofit of Existing Connections

Description: Install water meters at all connections.

Assumptions:

CASE 1: Installation of meters and meter boxes.

CASE 2: Installation of meters only.

1. Meters will be installed at all of pre-1992 residences within 10 years and all post 1992 connections within 2 years.

The MOU (page 23) requires 100% of existing unmetered accounts to be metered within 10 years of implementation date. As of January 1992, California law requires all new services to include water meter installation.

2. Weighted water usage per connection = 450 gpd/connection.

Weighted water usuage per connection is calculated based on 14,755 single family units, 648 multi-family connections at 2000 gpd/connection, and 315 commercial/institutional connections.

3. Metering will reduce water usage by 20%.

MOU, page 24.

4. Meter costs an average of $620 each, including meter, box, and overhead.

Cost estimate based on information obtained during a meter study for the City of Fresno (Brown and Caldwell, 1992).

5. Installation of only a meter costs $100 each.

The City of Lodi has installed meter boxes on connections occurring after 1992. Connections occurring after 1992 will only cost an additional $100 to completely meter.

6. It will cost an average of $18/year to read and maintain one meter.

Cost estimate based on information obtained during a meter study for the City of Fresno (Brown and Caldwell, 1992).

7. The life span of water meters is 20 years.

Public Utilities Commission Order 103 gives a 20 year life span for smaller than one-inch meters and 15 years for one-inch meters. It is assumed meters being installed are smaller than one-inch. This analysis does not include replacement of meters.

Table E-1c. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 5 – Large Landscape Conservation Programs and Incentives

Description: Conduct water surveys for accounts with large landscaped areas including schools, cemeteries, parks, and civic centers. Provide recommendations for water conservation.

Assumptions:

1. Eto-based water use budgets will be developed for 90 percent of the CII accounts with dedicated irrigation meters by the end of the second reporting period (22.5 percent per year for four years).

MOU (Page 27, Section C.a.)

2. Water surveys will be offered to 20 percent of the CII accounts with mixed use or no meters every reporting period (10 percent per year).

MOU (Page 27, Section C.b.)

3. Irrigation water use surveys will be completed for 15 percent of CII accounts with mixed use or no meters within 10 years of the date implementation was to commence. An agency will be considered on track if the percent of CII accounts with mixed use or no meters receiving landscape water use equals or exceeds the following: 1.5% by end of the first reporting period, 3.6% by end of second reporting period, 6.3% by end of third reporting period, 9.6% by end of fourth reporting period, and 13.5 percent by end of the 9th year. 15% must be reached by the end of the fifth reporting period.

MOU (Page 28, Section E.d.)

4. There are 26 dedicated landscape accounts and 1,324 CII mixed use accounts.

This is based on data provided by the City of Lodi, Public Water System Statistics, 1999 (Submitted March 2000).

5. Dedicated landscape accounts are an average size of 2 acres.

This is based on professional judgement.

6. CII mixed use account landscape areas are assumed to be an average of 0.5 acre in size.

This is based on professional judgement.

7. Water use prior to the survey is 5.1 ft per year.

Irrigation allocation is equal to 100 percent of local evapotranspiration (ETo), and the MOU estimates that surveys will reduce water usage by 15 percent. The local ETo was determined (53 in/year based on California Irrigation Management Information System data) and multiplied by 1.15 to obtain 61 inches (5.1 ft) per year for current water use. (Most conservative approach for economic analysis)

8. Surveys will reduce water usage by 15%.

MOU, page 29.

9. The life span of the large landscape water surveys is four years.

A & N Technical Services report (2000) gives a life span of four years for turf audits (page 2-20). It is assumed that water surveys for large landscapes will have a similar life span.

10. Each survey will cost $250 per acre.

This estimate is based on information presented in Cal Poly's 1988/89 annual report on their landscape water management program. The estimate includes labor, administration, evaluation and overhead.

Table E-1d. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 6 – High-Efficiency Washing Machine Rebate Programs
Description: Provide rebates to single-family residences for high-efficiency washing machines.
Assumptions 1. Each rebate will cost $75. *The MOU does not require implementation of this BMP if the maximum cost-effective rebate is less than $50 (MOU, page 31). A $50 rebate plus an additional $25 per rebate for program administration and overhead was assumed.* 2. Each high efficiency washing machine will reduce water usage by 5,100 gallons per year. *MOU, page 32.* 3. Rebates will be accepted by one percent of single-family residences per year for 20 years. *Estimate based on professional judgement.* 4. The life span of a high efficiency washing machine is 12 years. *Pekelney, D.M., T.W. Chesnutt, and W.M. Hanemann. 1996. Guidelines for Preparing Cost Effective Analysis of Urban Water Conservation Best Management Practices. Prepared for the California Urban Water Conservation Council. September 1996.*

Table E-1e. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 9 – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Description: Implement a program to conduct water-use surveys and customer incentives programs for CII customers.

Assumptions:

1. Water-use surveys will be conducted at 10% of CII accounts within 10 years of the date implementation is to commence. Surveys will be conducted according to the following schedule: 0.5% of the total number of surveys required by the end of the first reporting period, 2.4% by end of second reporting period, 4.2% by end of third reporting period, 6.4% by end of fourth reporting period, and 10% by the end of the fifth reporting period. Those customers will also be included in an incentives program.

MOU, page 37 and page 40, Section E.b.3

2. Ultra-low-flush toilets (ULFT) in CII establishments will be replaced to produce water savings over a 10 year implementation period equal to 15 percent of total water savings potential as determined in Table E-2. Economic Analysis Worksheets.

MOU, BMP 9, A.(b)ii.

3. Given the choice to implement BMP 9 A (c) or (d), we have selected to implement (c), CII Water Use Survey and Customer Incentives program.

MOU BMP 9, A.(c)

4. The life span of a water survey is four years.

It was assumed that the life span for a CII water survey is the same as the life span for a residential survey. A & N Technical Services report (2000, page 2-20) gives life spans for various components of a residential water survey. Four years was selected as a reasonable average value based on that information.

5. The average annual water savings resulting from a commercial and institutional water survey is 0.83 acre-feet per account.

A & N Technical Services report (2000, page 2-35) gives average annual water savings for three types of surveys; "analyst surveys", "consultant surveys" and "water efficiency studies". Analyst surveys are conducted by non-engineers, consultant surveys are conducted by engineers for sites that have process water, and water efficiency studies are conducted at major industrial facilities that use very large quantities of water. For purposes of this economic analysis, it was assumed that only analyst surveys will be conducted for commercial and institutional account surveys. Values for water savings in the A & N report represent the maximum potential water savings that could occur if a customer were to implement every possible water conservation measure. Experience has shown that approximately 25% of the maximum potential water savings is actually realized, which is what was assumed (personal communication with John Sweeten, Metropolitan Water District, 5-9-00.)

6. The average annual water savings resulting from an industrial water survey is 2.1 acre-feet per account.

A & N Technical Services report (2000, page 2-35) gives average annual water savings for three types of surveys; "analyst surveys", "consultant surveys" and "water efficiency studies". Analyst surveys are conducted by non-engineers, consultant surveys are conducted by engineers for sites that have process water, and water efficiency studies are conducted at major industrial facilities that use very large quantities of water. For purposes of this economic analysis, it was assumed that only consultant surveys will be conducted for industrial account surveys. Values for water savings in the A & N report represent the maximum potential water savings that could occur if a customer were to implement every possible water conservation measure. Experience has shown that approximately 25% of the maximum potential water savings is actually realized, which is what was assumed (personal communication with John Sweeten, Metropolitan Water District, 5-9-00.)

7. Each analyst survey (for commercial and institutional accounts) will cost an average of $680 and each consultant survey (for industrial accounts) will cost an average of $1,680. These costs include the cost

Table E-1e. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 9 – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts
Description: Implement a program to conduct water-use surveys and customer incentives programs for CII customers.
of conducting the survey and overhead. *A & N Technical Services report (2000, page 2-35).* 8. The cost of toilets, advertising, administration, overhead, and toilet recycling is $126 per ULFT. The cost does not include installation, which will be covered by the customer. 9. The life span of the new ULFTs is 20 years. *MOU, page 70.* 10. Table E-2. Economic Analysis Worksheet for BMP 9 requires the input of toilet counts per CII subsector. Number of 1992 toilets per CII subgroup has been estimated.

Table E-1f. Assumptions Used for Economic Analysis of Water Conservation BMPs

BMP 14 – Residential ULFT Replacement Programs

Description: Implement a program to replace existing high-water-using toilets with ultra-low-flush toilets (ULFT) in single- and multi-family residences.

Assumptions:

1. There are an average of 3.3 people per single-family residence and 2.4 people per multi-family residence.

Lodi has an average of 2.6 people per household (California Department of Finance Report E-5, Table 2 "City/County Population and Housing Estimates" January 1, 2000). Because useful data quantifying single-family and multi-family household sizes in this CSA are unavailable, it is assumed that a ratio of multi-family to single-family household sizes is 0.7.

2. There are an average of 1.8 toilets per single-family residence and 1.5 toilets per multi-family residence.

An average of 1.7 toilets per unit was calculated using 1990 census data concerning the number of bedrooms per housing unit. Based on professional judgement, it was assumed a one bedroom unit has 1 toilet, a two bedroom unit has 1.5 toilets, a three bedroom unit has 2 toilets, a four bedroom unit has 2.5 toilets and a five bedroom unit has 3 toilets. Because multi-family units tend to have fewer toilets on average than single-family units, it was assumed 1.5 toilets per multi-family residence and calculated that the single-family units would need to have 1.8 toilets per unit to achieve an overall average of 1.7 toilets per dwelling unit.

3. Water savings from ULFTs are 37 gpd/unit for single-family residences and 51.7 gpd/unit for multi-family residences.

MOU, Exhibit 6, Table 1 and Table 2.

4. Homes constructed after 1991 already have ULFTs.

As of January 1992, California legislation requires that ULFTs be installed in all newly constructed homes.

5. The life span of the new ULFTs is 20 years.

MOU, page 70.

6. Natural toilet replacement rate is 4% per year.

MOU, page 70.

7. Average resale rate for single-family units in San Joaquin County is 3.6%

Assumption based on the 1996 single-family average resale rate for San Joaquin County. This rate was obtained from the CUWCC Website, WWW.CUWCC.ORG, November 2000.

8. Average resale rate for multi-family units in San Joaquin County is 3.1%

Assumption based on the 1998 multi-family average resale rate for San Joaquin County. This rate was obtained from the CUWCC Website, WWW.CUWCC.ORG, November 2000.

9. The cost of toilets, advertising, administration, overhead, and toilet recycling is $126 per ULFT. The cost does not include installation, which will be covered by the customer.

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 1. Water Survey Programs for Single-Family and Multi-Family Residential Customers

									Benefits ($)					Costs ($)					
Calendar Year	Single Family Interventions	Multi Family Interventions	Percent Units Surveyed*	Single-Family Outdoor Savings (AF/yr)	Multi-Family Outdoor Savings (AF/yr)	Total Outdoor Savings (AF/yr)	Total Indoor Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
Pre-2002	0	0	0.0%	0	0.0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0
2002	115	51	0.8%	3	0.3	4	0.09	4	0	1,916	0	1,916	1,805	0	0	8,289	8,289	7,808	-6,003
2003	115	51	0.8%	3	0.3	4	0.09	8	0	3,832	0	3,832	3,401	0	0	8,289	8,289	7,356	-3,955
2004	161	71	1.1%	5	0.4	5	0.13	13	0	6,514	0	6,514	5,446	0	0	11,604	11,604	9,702	-4,255
2005	161	71	1.1%	5	0.4	5	0.13	18	0	9,197	0	9,197	7,243	0	0	11,604	11,604	9,140	-1,896
2006	207	91	1.4%	6	0.6	7	0.17	21	0	10,729	0	10,729	7,961	0	0	14,920	14,920	11,070	-3,109
2007	207	91	1.4%	6	0.6	7	0.17	25	0	12,262	0	12,262	8,571	0	0	14,920	14,920	10,429	-1,858
2008	253	111	1.7%	8	0.7	8	0.20	28	0	13,795	0	13,795	9,084	0	0	18,235	18,235	12,008	-2,924
2009	253	111	1.7%	8	0.7	8	0.20	31	0	15,328	0	15,328	9,509	0	0	18,235	18,235	11,312	-1,804
2010	415	182	2.7%	12	1.1	13	0.33	38	0	18,776	0	18,776	10,973	0	0	29,839	29,839	17,438	-6,465
2011	415	182	2.7%	12	1.1	13	0.33	44	0	22,225	0	22,225	12,236	0	0	29,839	29,839	16,428	-4,192
2012								36	0	18,010	0	18,010	9,341						9,341
2013								28	0	13,795	0	13,795	6,740						6,740
2014								14	0	6,897	0	6,897	3,175						3,175
2015																			
2016																			
2017																			
2018																			
2019																			
2020																			
Totals:	2,304	1,011	15%	69	6	75	1.9	307	0	153,276	0	153,276	95,486	0	0	165,773	165,773	112,691	-17,206

*Percent surveyed from MOU, Exhibit 1,1.E(d)

Value of conserved water ($/AF) =	500
Discount rate (real) =	6.15%
Indoor water savings (gpd/unit) =	0.50
Outdoor water savings =	10%
Single-family outdoor water usage (gpd/unit) =	266
Multi-family outdoor water usage (gpd/unit) =	54
Conservation measure unit cost ($) =	50
2001 single family units =	15,363
2001 multi-family units =	6,740

Benefit cost ratio:		0.8
Simple pay-back period (years):		15.3
Discounted cost / water saved ($/acre-feet):		368
NPV / water saved ($/acre-feet):		-56

Credit Table for Previously Performed Surveys

Year	Single family units surveys	Multi-family units surveys	% Credit	Single family credits	Multi-family credits
Pre-1990			0.0%	0	0
1990			12.5%	0	0
1991			25.0%	0	0
1992			37.5%	0	0
1993			50.0%	0	0
1994			62.5%	0	0
1995			75.0%	0	0
1996			87.5%	0	0
1997			100.0%	0	0
1998			100.0%	0	0
1999			100.0%	0	0
2000			100.0%	0	0
2001			100.0%	0	0
				0	0

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 4. Metering With Commodity Rates for all New Connections and Retrofit Existing Connections

Case 1- Install Meters and Meter Boxes

					Benefits ($)					Costs ($)						
Calendar Year	Percent of Meters Installed	Accounts Retrofitted With Meters And Meter Boxes	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Annual Meters	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
2003	5%	740	456	456	0	228,050	0	228,050	202,391	458,986	0	740	13,325	472,311	419,168	-216,778
2004	5%	740	456	912	0	456,100	0	456,100	381,329	458,986	0	1,481	26,651	485,637	406,024	-24,695
2005	7%	1,036	639	1,551	0	775,370	0	775,370	610,702	642,580	0	2,517	45,306	687,887	541,797	68,904
2006	7%	1,036	639	2,189	0	1,094,640	0	1,094,640	812,216	642,580	0	3,553	63,962	706,542	524,250	287,966
2007	9%	1,333	821	3,010	0	1,505,130	0	1,505,130	1,052,093	826,175	0	4,886	87,948	914,122	638,976	413,117
2008	9%	1,333	821	3,831	0	1,915,621	0	1,915,621	1,261,448	826,175	0	6,219	111,933	938,108	617,750	643,698
2009	11%	1,629	1003	4,835	0	2,417,331	0	2,417,331	1,499,602	1,009,769	0	7,847	141,249	1,151,018	714,040	785,563
2010	11%	1,629	1003	5,838	0	2,919,041	0	2,919,041	1,705,926	1,009,769	0	9,476	170,565	1,180,334	689,803	1,016,123
2011	18%	2,665	1642	7,480	0	3,740,021	0	3,740,021	2,059,084	1,652,350	0	12,141	218,537	1,870,886	1,030,024	1,029,060
2012	18%	2,665	1642	9,122	0	4,561,001	0	4,561,001	2,365,594	1,652,350	0	14,806	266,508	1,918,858	995,228	1,370,366
2013				9,122	0	4,561,001	0	4,561,001	2,228,539	0	0	14,806	266,508	266,508	130,218	2,098,321
2014				9,122	0	4,561,001	0	4,561,001	2,099,424	0	0	14,806	266,508	266,508	122,673	1,976,751
2015				9,122	0	4,561,001	0	4,561,001	1,977,790	0	0	14,806	266,508	266,508	115,566	1,862,224
2016				9,122	0	4,561,001	0	4,561,001	1,863,203	0	0	14,806	266,508	266,508	108,871	1,754,333
2017				9,122	0	4,561,001	0	4,561,001	1,755,255	0	0	14,806	266,508	266,508	102,563	1,652,692
2018				9,122	0	4,561,001	0	4,561,001	1,653,561	0	0	14,806	266,508	266,508	96,621	1,556,940
2019				9,122	0	4,561,001	0	4,561,001	1,557,759	0	0	14,806	266,508	266,508	91,023	1,466,736
2020				9,122	0	4,561,001	0	4,561,001	1,467,507	0	0	14,806	266,508	266,508	85,749	1,381,758
Totals:	100%	14,806	9,122	112,201	0	56,100,315	0	56,100,315	26,553,423	9,179,720	0		3,278,048	12,457,768	7,430,344	19,123,080

Value of conserved water ($/AF) =	500
Discount rate (real) =	6.15%
Connection unit water use demand (gpd/connection) =	550
Water savings =	20%
Conservation measure unit cost for connections with no meter boxes, no meters ($) =	620
Cost to read and maintain one meter ($/year) =	18
Percent units receiving meters =	10%
Number of unmeterd accounts pre-1993(no meter boxes, no meters) =	14,806

Benefit cost ratio:	3.6
Simple pay-back period (years):	6
Discounted cost / water saved ($/acre-feet):	66
NPV / water saved ($/acre-feet):	170

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 4. Metering With Commodity Rates for all New Connections and Retrofit Existing Connections

Case 2- Install Meters

				Benefits ($)					Costs ($)					
Calendar Year	Accounts Retrofitted With Meters Only	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
2003	461	284	284	0	141,857	0	141,857	125,896	46,050	0	8,289	54,339	48,225	77,671
2004	461	284	567	0	283,715	0	283,715	237,204	46,050	0	16,578	62,628	52,361	184,843
2005	0	0	567	0	283,715	0	283,715	223,461	0	0	16,578	16,578	13,057	210,404
2006	0	0	567	0	283,715	0	283,715	210,515	0	0	16,578	16,578	12,301	198,214
2007	0	0	567	0	283,715	0	283,715	198,318	0	0	16,578	16,578	11,588	186,730
2008	0	0	567	0	283,715	0	283,715	186,828	0	0	16,578	16,578	10,917	175,911
2009	0	0	567	0	283,715	0	283,715	176,004	0	0	16,578	16,578	10,284	165,720
2010	0	0	567	0	283,715	0	283,715	165,807	0	0	16,578	16,578	9,688	156,118
2011	0	0	567	0	283,715	0	283,715	156,200	0	0	16,578	16,578	9,127	147,073
2012	0	0	567	0	283,715	0	283,715	147,151	0	0	16,578	16,578	8,598	138,552
2013	0		567	0	283,715	0	283,715	138,625	0	0	16,578	16,578	8,100	130,525
2014	0		567	0	283,715	0	283,715	130,594	0	0	16,578	16,578	7,631	122,963
2015	0		567	0	283,715	0	283,715	123,027	0	0	16,578	16,578	7,189	115,839
2016	0		567	0	283,715	0	283,715	115,900	0	0	16,578	16,578	6,772	109,127
2017	0		567	0	283,715	0	283,715	109,185	0	0	16,578	16,578	6,380	102,805
2018	0		567	0	283,715	0	283,715	102,859	0	0	16,578	16,578	6,010	96,849
2019	0		567	0	283,715	0	283,715	96,900	0	0	16,578	16,578	5,662	91,238
2020	0		567	0	283,715	0	283,715	91,286	0	0	16,578	16,578	5,334	85,952
Totals:		567	9,930	0	4,965,010	0	4,965,010	2,735,758	92,100	0	290,115	382,215	239,225	2,496,533

Value of conserved water ($/AF) =	500
Discount rate (real) =	6.15%
Connection unit water use demand (gpd/connection) =	550
Water savings =	20%
Conservation measure unit cost for connections with meter box, no meter (install meter only) ($) =	100
Cost to read and maintain one meter ($/year) =	18
Percent units receiving meters =	10%
Number of accounts added to system after 1992(meter boxes, no meters) =	921

Benefit cost ratio:	11.4
Simple pay-back period (years):	2
Discounted cost / water saved ($/acre-feet):	24
NPV / water saved ($/acre-feet):	251

City of Lodi
Table E-2. Economic Analysis Worksheets
BMP 5. Large Landscape Conservation Programs and Incentives

							Benefits ($)					Costs ($)					
Calendar Year	CII Accounts w/Dedicated Irr. Meters *Interventions*	CII Accounts w/Mixed Use or No Meters *Offered Surveys*	CII Accounts w/Mixed Use or No Meters *Percent Surveyed*[a]	*Interventions*	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
Pre-2003				0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	6	132	0.8%	10	13	13	0	6,399	0	6,399	5,679	0	0	4,166	4,166	3,697	1,982
2004	6	132	0.8%	10	13	26	0	12,799	0	12,799	10,701	0	0	4,166	4,166	3,483	7,217
2005	6	132	1.1%	14	14	40	0	19,961	0	19,961	15,722	0	0	4,663	4,663	3,673	12,049
2006	6	132	1.1%	14	14	54	0	27,123	0	27,123	20,125	0	0	4,663	4,663	3,460	16,665
2007		132	1.4%	18	7	48	0	24,155	0	24,155	16,885	0	0	2,234	2,234	1,562	15,323
2008		132	1.4%	18	7	42	0	21,188	0	21,188	13,952	0	0	2,234	2,234	1,471	12,481
2009		132	1.7%	22	8	36	0	18,220	0	18,220	11,303	0	0	2,731	2,731	1,694	9,609
2010		132	1.7%	22	8	31	0	15,252	0	15,252	8,914	0	0	2,731	2,731	1,596	7,318
2011		132	2.7%	36	14	37	0	18,684	0	18,684	10,287	0	0	4,469	4,469	2,460	7,827
2012		132	2.7%	36	14	44	0	22,116	0	22,116	11,471	0	0	4,469	4,469	2,318	9,153
2013						36	0	17,922	0	17,922	8,757						8,757
2014						27	0	13,727	0	13,727	6,319						6,319
2015						14	0	6,864	0	6,864	2,976						2,976
2016																	
2017																	
2018																	
2019																	
2020																	
Totals:	23	1324	15%	199	112	449	0	224,410	0	224,410	143,089	0	0	36,525	36,525	25,414	117,675

[a]Percent surveyed from MOU, Exhibit 1,5.E(d)

Credit Table for Previously Performed Surveys			
Year	# of Surveys	% Credit	Credits
Surveyed prior to July 1, 1996 w/follow up inspection		100%	0
Surveyed prior to July 1, 1996 - have not received follow up inspection		50%	0
Surveyed after July 1, 1996		100%	0
Total			0

Value of conserved water ($/AF) =	500	
Discount rate (real) =	6.15%	
Acres / CII accounts with dedicated irrigation meters =	2.0	
Acres / CII accounts with mixed use meters =	0.5	
Annual water use (ac-ft/acre) =	5.1	
Water savings =	15%	
Conservation measure unit cost ($/acre) =	250	
Number of CII accounts with dedicated irrigation meters in 1997 =	26	
Number of CII accounts with mixed use or no meter as of 1997 =	1324	
Percent of CII accounts with dedicated irrigation meters to receive Eto-based water use budgets annually for two reporting periods =	22.5%	
Percent of CII accounts with mixed use or no meters offered surveys annually =	10%	

Benefit cost ratio:	5.6
Simple pay-back period (years):	2.3
Discounted cost / water saved ($/acre-feet):	57
NPV / water saved ($/acre-feet):	262

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 6. High-Efficiency Washing Machine Rebate Programs

					Benefits ($)					Costs ($)					
Calendar Year	Total Single-Family Units	Number of Units Accepting Rebates	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
2003	15363	154	2.4	2	0	1,202	0	1,202	1,067	0	7,682	3,841	11,523	10,226	-9,159
2004	15677	157	2.5	5	0	2,429	0	2,429	2,031	0	7,838	3,919	11,758	9,830	-7,799
2005	15990	160	2.5	7	0	3,681	0	3,681	2,899	0	7,995	3,998	11,993	9,446	-6,547
2006	16304	163	2.6	10	0	4,956	0	4,956	3,678	0	8,152	4,076	12,228	9,073	-5,395
2007	16617	166	2.6	13	0	6,257	0	6,257	4,374	0	8,309	4,154	12,463	8,712	-4,338
2008	16963	170	2.7	15	0	7,584	0	7,584	4,994	0	8,481	4,241	12,722	8,378	-3,383
2009	17309	173	2.7	18	0	8,939	0	8,939	5,545	0	8,654	4,327	12,981	8,053	-2,508
2010	17654	177	2.8	21	0	10,321	0	10,321	6,032	0	8,827	4,414	13,241	7,738	-1,707
2011	18000	180	2.8	23	0	11,729	0	11,729	6,458	0	9,000	4,500	13,500	7,433	-975
2012	18346	183	2.9	26	0	13,165	0	13,165	6,828	0	9,173	4,587	13,760	7,136	-308
2013	18728	187	2.9	29	0	14,631	0	14,631	7,149	0	9,364	4,682	14,046	6,863	286
2014	19110	191	3.0	32	0	16,126	0	16,126	7,423	0	9,555	4,777	14,332	6,597	826
2015	19491	195	3.1	33	0	16,449	0	16,449	7,133	0	9,746	4,873	14,619	6,339	794
2016	19873	199	3.1	34	0	16,778	0	16,778	6,854	0	9,937	4,968	14,905	6,089	765
2017	20255	203	3.2	34	0	17,111	0	17,111	6,585	0	10,128	5,064	15,191	5,846	739
2018	20677	207	3.2	35	0	17,454	0	17,454	6,328	0	10,338	5,169	15,508	5,622	706
2019	21099	211	3.3	36	0	17,804	0	17,804	6,081	0	10,549	5,275	15,824	5,404	676
2020	21520	215	3.4	36	0	18,161	0	18,161	5,843	0	10,760	5,380	16,140	5,193	650
Totals:		3,290	51	410	0	204,778	0	204,778	97,301	164,488	164,488	82,244	246,732	133,978	-36,677

Value of conserved water ($/AF) =	500
Discount rate (real) =	6.15%
Water savings (gpy/unit) =	5,100
Amount of rebate ($) =	50
Cost to administer rebate ($) =	25
Percent accepting rebates =	1.0%
Single family units in 2000 =	15,050
Single family units in 2005 =	16,617
Single family units in 2010 =	18,346
Single family units in 2015 =	20,255
Single family units in 2020 =	22,364

Benefit cost ratio:	0.7
Simple pay-back period (years):	28
Discounted cost / water saved ($/acre-feet):	327
NPV / water saved ($/acre-feet):	-90

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

									Benefits ($)					Costs ($)					
Calendar Year	*From BMP 9 ULFT Coverage Calculator*		CII accounts surveyed				Incremental Savings	Annual Savings	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
	No. of Installed Toilets	Annual Savings (AF/yr)	*Percent Surveyed*[a]	Commercial Interventions	Industrial Interventions	Institutional Interventions	(Surveys) (AF/yr)	(Total) (AF/yr)											
Pre-2003			0.0%	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0
2003			1.2%	15.2	0.6	0.3	14.3	14	0	7,127	0	7,127	6,325	0	0	11,652	11,652	10,341	-4,016
2004			1.2%	15.2	0.6	0.3	14.3	29	0	14,254	0	14,254	11,917	0	0	11,652	11,652	9,742	2,175
2005	273	9	0.9%	11.4	0.5	0.2	10.7	48	0	24,231	0	24,231	19,085	0	0	43,135	43,135	33,975	-14,889
2006	273	19	0.9%	11.4	0.5	0.2	10.7	68	0	34,209	0	34,209	25,383	0	0	43,135	43,135	32,006	-6,624
2007	273	28	1.1%	14.0	0.6	0.3	13.1	76	0	38,247	0	38,247	26,735	0	0	45,077	45,077	31,509	-4,774
2008	273	37	1.1%	14.0	0.6	0.3	13.1	85	0	42,285	0	42,285	27,845	0	0	45,077	45,077	29,684	-1,839
2009	273	46	1.8%	22.9	1.0	0.5	21.4	105	0	52,263	0	52,263	32,421	0	0	51,874	51,874	32,181	241
2010	273	56	1.8%	22.9	1.0	0.5	21.4	124	0	62,240	0	62,240	36,374	0	0	51,874	51,874	30,316	6,058
2011	273	65						121	0	60,340	0	60,340	33,220	0	0	34,396	34,396	18,937	14,283
2012	273	74						117	0	58,439	0	58,439	30,310	0	0	34,396	34,396	17,840	12,470
2013	273	83						105	0	52,381	0	52,381	25,594	0	0	34,396	34,396	16,806	8,787
2014	273	93						93	0	46,323	0	46,323	21,322	0	0	34,396	34,396	15,833	5,490
2015								93	0	46,323	0	46,323	20,087						20,087
2016								93	0	46,323	0	46,323	18,923						18,923
2017								93	0	46,323	0	46,323	17,827						17,827
2018								93	0	46,323	0	46,323	16,794						16,794
2019								93	0	46,323	0	46,323	15,821						15,821
2020								93	0	46,323	0	46,323	14,904						14,904
Totals:	2,730	510	10.0%	127	5	3	119	1,541	0	770,276	0	770,276	400,888	0	0	441,064	441,064	279,169	121,719

[a]Percent surveyed from MOU, Exhibit 1,9.E(b.3)

Value of conserved water ($/AF) =	500
Discount rate (real) =	6.15%

Credit Table for Previously Installed Toilets

Year	Avg. # of Installed Toilets	Incremental Water Savings (Ac-ft/yr)	Annual Water Savings (AF)
1991		0	0
1992		0	0
1993		0	0
1994		0	0
1995		0	0
1996		0	0
1997		0	0
1998		0	0
1999		0	0
2000		0	0
Total			0

Analyst survey - Annual water savings (AF/account) =	0.83
Analyst survey - Conservation measure unit cost ($) =	680
Consultant survey - Annual water savings (AF/account) =	2.1
Consultant survey - Conservation measure unit cost ($) =	1680
Cost of conservation measure for ULFT replacement ($) =	126
Number of commercial accounts in 1997 =	1270
Number of Industrial accounts in 1997 =	53
Number of Institutional accounts in 1997 =	27
Percent units surveyed =	10%

Benefit cost ratio:	1.4
Simple pay-back period (years):	9.1
Discounted cost / water saved ($/acre-feet):	181
NPV / water saved ($/acre-feet):	79

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Credit Table for Previously Performed Surveys																				
Year		# of Surveys				Credits														
		Commercial	Industrial	Institutional	% Credit	Commercial	Industrial	Institutional												
Surveyed prior to July 1, 1996 w/follow up inspection					100%	0	0	0												
Surveyed prior to July 1, 1996 - have not received follow up inspection					50%	0	0	0												
Surveyed after July 1, 1996					100%	0	0	0												
Total						0	0	0												
Enter CII Toilet Census Results					Annual Savings (gpd)															
CII Subsector	Unadjusted Toilet Count	Adjusted Toilet Count	Savings Per ULFT (gpd)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total						
Hotels/Motels	3,175	2,485	16	44,945	43,147	41,421	39,764	38,174	36,647	35,181	33,773	32,423	31,126	376,599						
Eating and Drinking	3,175	2,485	47	132,025	126,744	121,674	116,807	112,135	107,649	103,343	99,210	95,241	91,432	1,106,260						
Health Services	68	53	21	1,263	1,213	1,164	1,118	1,073	1,030	989	949	911	875	10,586						
Offices	3,175	2,485	20	56,181	53,934	51,776	49,705	47,717	45,808	43,976	42,217	40,528	38,907	470,749						
Retail/Wholesale	3,175	2,485	40	112,361	107,867	103,552	99,410	95,434	91,616	87,952	84,434	81,056	77,814	941,497						
Other		0	18	0	0	0	0	0	0	0	0	0	0	0						
Industrial	530	415	23	10,785	10,354	9,939	9,542	9,160	8,794	8,442	8,104	7,780	7,469	90,369						
Churches	68	53	28	1,685	1,617	1,552	1,490	1,431	1,374	1,319	1,266	1,215	1,167	14,115						
Gov't	68	53	25	1,504	1,444	1,386	1,331	1,277	1,226	1,177	1,130	1,085	1,042	12,603						
Schools: K to 12	68	53	20	1,203	1,155	1,109	1,065	1,022	981	942	904	868	833	10,082						
Total	13,502	10,569	258	361,952	347,474	333,575	320,232	307,422	295,126	283,321	271,988	261,108	250,664	3,032,860						
Estimated Rate of CII Toilet Turnover (percent of remaining stock per year)	0.04																			
Average Savings per toilet (gpd)	30.30																			
Coverage requirement is 15 percent of Total Savings Potential minus savings from credits:																				
(gpd)	(ac-ft)																			
454,929	510																			

City of Lodi
Table E-2. Economic Analysis Worksheets
BMP 14. Residential ULFT Replacement Programs (3 pages)

	Determination of Water Conservation Goal: Single-Family Units										
Calendar Year	Single-Family Units	SF Units Naturally Retrofitted	SF Toilets Naturally Retrofitted	Water Savings from Natural Replacement SF (AF/yr)	Single-Family Units	SF Units Naturally Retrofitted	Single-Family Turnover	Combined SF Homes Retrofitted	Combined SF Toilets Retrofitted	Water Savings from Natural Replacement and Turnover SF (AF/yr)	Water Savings from Turnover SF (AF/yr)
2002	8,397	0	0	0	8,397	0	0	0	0	0	0
2003	8,061	336	605	14	7,757	336	305	641	1,153	27	13
2004	7,739	322	580	13	7,165	310	282	592	1,065	25	11
2005	7,429	310	557	13	6,618	287	260	547	984	23	10
2006	7,132	297	535	12	6,113	265	240	505	909	21	9
2007	6,847	285	514	12	5,647	245	222	466	840	19	8
2008	6,573	274	493	11	5,216	226	205	431	776	18	7
2009	6,310	263	473	11	4,818	209	189	398	716	16	6
2010	6,058	252	454	10	4,450	193	175	368	662	15	5
2011	5,815	242	436	10	4,111	178	162	340	611	14	4
2012	5,583	233	419	10	3,797	164	149	314	565	13	3
2013	5,359	223	402	9	3,507	152	138	290	521	12	3
2014	5,145	214	386	9	3,240	140	127	268	482	11	2
2015	4,939	206	370	9	2,993	130	118	247	445	10	2
2016	4,742	198	356	8	2,764	120	109	228	411	9	1
2017	4,552	190	341	8	2,553	111	100	211	380	9	1
2018	4,370	182	328	8	2,358	102	93	195	351	8	1
2019	4,195	175	315	7	2,179	94	86	180	324	7	0
2020	4,027	168	302	7	2,012	87	79	166	299	7	0
Totals:											

Credit Table for Previously Installed ULF Toilets

Year	Avg. # of Installed Toilets: Single Family	Avg. # of Installed Toilets: Multi-family	Incremental Water Savings (Ac-ft/yr)	Annual Water Savings (Ac-ft/yr)
1991			0	0
1992			0	0
1993			0	0
1994			0	0
1995			0	0
1996			0	0
1997			0	0
1998			0	0
1999			0	0
2000			0	0
	0	0		0

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 14. Residential ULFT Replacement Programs (3 pages)

	Determination of Water Conservation Goal: Multi-Family Units											Conservation Goal - Combined	
Calendar Year	Multi-Family Units	MF Units Naturally Retrofitted	MF Toilets Naturally Retrofitted	Water Savings from Natural Replacement MF (AF/yr)	Multi-Family Units	MF Units Naturally Retrofitted	Multi-Family Turnover	Combined MF Homes Retrofitted	Combined MF Toilets Retrofitted	Water Savings from Natural Replacement and Turnover MF (AF/yr)	Water Savings from Turnover MF (AF/yr)	Annual Water Savings from Turnover (AF/yr)	Cumulative Water Savings from Turnover (AF/yr)
2002	3,574	0	0	0.0	3,574	0	0	0	0	0	0	0	0
2003	3,431	143	214	8.3	3,321	143	110	253	380	15	6	19	19
2004	3,294	137	206	7.9	3,085	133	103	235	353	14	6	36	55
2005	3,162	132	198	7.6	2,867	123	95	219	328	13	5	51	106
2006	3,036	126	190	7.3	2,663	115	89	203	305	12	4	64	169
2007	2,914	121	182	7.0	2,474	107	82	189	283	11	4	75	245
2008	2,798	117	175	6.8	2,299	99	76	175	263	10	3	85	330
2009	2,686	112	168	6.5	2,136	92	71	163	245	9	3	94	423
2010	2,578	107	161	6.2	1,985	85	66	151	227	9	3	101	525
2011	2,475	103	155	6.0	1,844	79	61	141	211	8	2	107	632
2012	2,376	99	149	5.7	1,713	74	57	131	196	8	2	112	744
2013	2,281	95	143	5.5	1,592	69	53	121	182	7	2	117	861
2014	2,190	91	137	5.3	1,479	64	49	113	169	7	1	120	981
2015	2,102	88	131	5.1	1,374	59	46	105	157	6	1	123	1,104
2016	2,018	84	126	4.9	1,277	55	42	97	146	6	1	125	1,229
2017	1,937	81	121	4.7	1,186	51	39	91	136	5	1	126	1,355
2018	1,860	77	116	4.5	1,102	47	37	84	126	5	0	127	1,482
2019	1,786	74	112	4.3	1,024	44	34	78	117	5	0	128	1,610
2020	1,714	71	107	4.1	951	41	32	73	109	4	0	128	1,738
											Value of conserved water ($/AF) =		500
											Discount rate (real) =		6.15%
											Natural toilet replacement rate =		4.0%
											Annual single-family housing turnover rate =		3.6%
											Annual multi-family housing turnover rate =		3.1%
											Water savings due to toilet replacement at SF homes (gal/dwelling unit/day) =		37.0
											Water savings due to toilet replacement at MF homes (gal/dwelling unit/day) =		51.7
											Number of toilets per SF home =		1.8
											Number of toilets per MF home =		1.5
											Cost of conservation measure ($) =		126
											1991 single family units =		13,157
											1991 multi-family units =		5,600

City of Lodi

Table E-2. Economic Analysis Worksheets

BMP 14. Residential ULFT Replacement Programs (3 pages)

	Water Savings from ULFT Replacement Program						Benefits ($)					Costs ($)					
Calendar Year	No. of SF Toilets Required to be Replaced	Incremental[a] Water Savings SF (AF/yr)	No. of MF Toilets Required to be Replaced	Incremental[a] Water Savings MF (AF/yr)	Annual[b] Water Savings (AF/yr)	Cummulative[c] Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
Pre-2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	25	1	25	1	2	2	0	770	0	770	726	0	0	6,300	6,300	5,935	-5,209
2003	300	7	300	12	20	22	0	10,016	0	10,016	8,889	0	0	75,600	75,600	67,094	-58,205
2004	250	6	150	6	32	53	0	15,790	0	15,790	13,201	0	0	50,400	50,400	42,138	-28,937
2005	250	6	250	10	47	100	0	23,494	0	23,494	18,504	0	0	63,000	63,000	49,620	-31,116
2006	250	6	250	10	62	163	0	31,198	0	31,198	23,149	0	0	63,000	63,000	46,746	-23,597
2007	250	6	250	10	78	240	0	38,903	0	38,903	27,193	0	0	63,000	63,000	44,037	-16,844
2008	100	2	100	4	84	324	0	41,985	0	41,985	27,647	0	0	25,200	25,200	16,594	11,053
2009	100	2	100	4	90	414	0	45,066	0	45,066	27,957	0	0	25,200	25,200	15,633	12,324
2010	100	2	100	4	96	511	0	48,148	0	48,148	28,138	0	0	25,200	25,200	14,727	13,411
2011	100	2	100	4	102	613	0	51,230	0	51,230	28,205	0	0	25,200	25,200	13,874	14,331
2012	100	2	100	4	109	722	0	54,312	0	54,312	28,169	0	0	25,200	25,200	13,070	15,099
2013					109	830	0	54,312	0	54,312	26,537	0	0	0	0	0	26,537
2014					109	939	0	54,312	0	54,312	25,000	0	0	0	0	0	25,000
2015					109	1,048	0	54,312	0	54,312	23,551	0	0	0	0	0	23,551
2016					109	1,156	0	54,312	0	54,312	22,187	0	0	0	0	0	22,187
2017					109	1,265	0	54,312	0	54,312	20,901	0	0	0	0	0	20,901
2018					109	1,374	0	54,312	0	54,312	19,690	0	0	0	0	0	19,690
2019					109	1,482	0	54,312	0	54,312	18,549	0	0	0	0	0	18,549
2020					109	1,591	0	54,312	0	54,312	17,475	0	0	0	0	0	17,475
	1,425		1,325		1,591		0	795,404	0	795,404	405,669	0	0	447,300	447,300	329,468	76,201

[a]Incremental Water Savings is water savings from replaced toilets during corresponding year only.

Benefit cost ratio: **1.2**

[b]Annual Water Savings is water savings from all replaced toilets through corresponding year.

Simple pay-back period (years): **16**

[c]Cummulative Water Savings is running total of water saved through corresponding year. "Cummulative Water Savings" must match "Cummulative Water Savings from Turnover" within 10% each reporting period through 2008.

Discounted cost / water saved ($/acre-feet): **207**

NPV / water saved ($/acre-feet): **48**

WATER SHORTAGE CONTINGENCY PLAN
CITY OF LODI

TABLE OF CONTENTS

This document is a Water Shortage Contingency Plan for the City of Lodi water system (City). The purpose of this contingency plan is to provide a plan of action to be followed at the various stages of a water shortage.

SECTION 1. WORST CASE SCENARIO

California Water Code section 10632 (b) requires an estimate of the minimum annual water supply availability during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. The City of Lodi's water supply is 100% groundwater. Although regional groundwater levels have been dropping, no short-term water supply problems are anticipated in the next three years.

The available water supply for the City is the water production well capacity of 33,695 gallons per minute (Year 2000) or 48.5 million gallons per day (mgd). The annual average well production for 1999 was 14.81 mgd. Loss of water supply capacity could occur due to mechanical problems with wells, pumps, motors, etc. of the distribution system. Preventative maintenance programs aid in minimizing the occurrence of mechanical failures. In addition, a water supply capacity loss may be caused by a change in water quality due to well contamination. Worst case water supply projections are not included in this section because distribution system mechanical failures and well contamination events are not expected and the capacity loss associated with each problem is difficult to quantify.

SECTION 2. WATER SUPPLY SHORTAGE STAGES AND CONDITIONS

This section describes the stages of action to be undertaken in response to water supply shortages. Included is an outline of specific water supply conditions that are applicable to each stage.

Per California Water Code section 10632 (a), the City has developed five stages of action to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

The five stages of action are defined below. The stage determination and public declaration during a water supply shortage will be made by the Public Works Director.

Stage I – Normal Conditions: The City is able to meet all immediate needs of the customers.

Stage II – Water Alert: A 5% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Stage III – Water Warning: A 15% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Stage IV – Water Crisis: A 30% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

Stage V – Water Emergency: A 50% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

The water stages are described in detail in Section 3.

SECTION 3. MANDATORY PROHIBITIONS, CONSUMPTION REDUCTION METHODS, AND PENALTIES

The prohibitions, consumption reduction methods, and penalties and charges for each of the five water supply stages are included in this section as required in California Water Code sections 10632 (d), 10632 (e), and 10632 (f), respectively.

Stage I. Normal Water Conditions

All requirements of the City's Water Conservation Ordinance, Lodi Municipal Code, Section 13.08.290, shall be in effect for Stage I as normal conditions. Lodi's water conservation program consists mainly of outdoor watering restrictions enforced by water conservation patrol staff, public education through local fairs, bill inserts, and newspaper articles, and an in-school education program. The waste of water is prohibited and defined in the Water Conservation Ordinance as:

- Failure to repair a controllable leak of water.
- Watering of lawns, flowerbeds, parking areas, tennis courts, patios, streets, or other exterior paved areas on days or times other than those outlined in Section 13.08.240 of the Water Conservation Ordinance as:
  - A. Watering Days:
    1. Premises having odd numbered street addresses on Wednesday, Friday, and Sunday.
    2. Premises having even numbered street addresses on Tuesday, Thursday, and Saturday.
  - B. Watering Hours: Any hour except that between May 1 and September 30 (inclusive) of each year watering between the hours of 10 a.m. and 6 p.m. is prohibited.
- Washing of sidewalks, driveways, parking areas, tennis courts, patios, streets, or other exterior paved areas or buildings except when required to remove any spillage of substances that may be a danger to public health or safety.
- Washing with water any motor vehicles, trailers, or movable equipment other than with a bucket and rinsing the vehicle or equipment by use of a hose for not more than three minutes.
- Use of a hose without a positive shut off nozzle.
- The excess watering of any area so that water flows into a gutter or any drainage area for a period exceeding three minutes.
- The unnecessary running of water in any residential, commercial, or industrial establishment onto the floor, pavement, ground or into any drain or drainage area, with any equipment or in any way for more than three minutes.
- Overwatering of lawns or landscapes from November 1 through February 28, or during or immediately following a rain.

Enforcement procedures and penalties for water wasting as defined in Section 13.08.250 of Lodi's Water Conservation Ordinance include:

- First Water Waste: Notification of water waste to the person at the premises of water waste by delivering an Information Sheet (included in Appendix C of Lodi's 2000 Urban Water Management Plan).
- Second Water Waste: In the event of a second waste of water within a 12 month period within 12 months of a first , the City will send a written notice to the person who receives the utility bill at the premises of water waste.
- Third Water Waste: In the event of a third waste of water within 12 months of a previous waste of water, the City will send a written notice and a $35 charge to the person who receives the utility bill for the premise of water waste.
- Fourth Water Waste: In the event of a fourth waste of water within 12 months of a previous waste of water, the City will send a written notice and a $75 charge to the person who receives the utility bill for the premises of the water waste.
- Fifth Water Waste: In the event of a fifth waste of water within 12 months of a previous waste of water, the City will send a written notice and a $150 charge to the person who receives the utility bill for the premise of the water waste. The City may also require a water meter and/or a flow restrictor to be installed at the waster's expense.

In addition to the enforcement procedures above, any person who wastes water, may also be charged with an infraction as per Sections 13.08.250 and 13.08.280 of the Water Conservation Ordinance.

Stage II. Water Alert

During Stage II, water alert conditions are declared and voluntary conservation encouraged. The water shortage situation is explained to the public and voluntary water conservation is requested. The City also explains other stages and forecasts future actions.

All mandatory requirements of Stage I shall remain in effect. Existing on-going water conservation measures are continued and emphasized as necessary to alert the public of the nature of the water supply shortage. The City maintains an ongoing public information campaign consisting of distribution of literature, speaking engagements, bill inserts, and conversation messages printed in local newspapers. Educational programs in area schools are ongoing and utilized as necessary.

Enforcement procedures and penalties for water wasting will continue as described in the Lodi Water Conservation Ordinance Sections 13.08.250 and 13.08.280.

Stage III. Water Warning

During Stage III, the water supply shortage is moderate. The City aggressively continues its public information and education programs. Consumers are asked for a 15 percent or greater voluntary or mandatory water use reduction.

All mandatory requirements of Stages I and II shall remain in effect. Additional requirements may include:

- Landscape irrigation restrictions shall be implemented to limit the allowable frequency of irrigation to a maximum of TWO days per week and based on the following schedule:
  1. Premises having odd numbered street addresses irrigate only on Wednesday and Sunday.
  2. Premises having even numbered street addresses irrigate only on Tuesday and Saturday.
- Businesses are not to serve water unless requested.

Enforcement procedures and penalties for water wasting will continue as described in the Lodi Water Conservation Ordinance Sections 13.08.250 and 13.08.280.

Stage IV. Water Crisis

During Stage IV of a water supply shortage, the shortage is severe, a 30% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

All mandatory requirements of Stages I, II, and III shall remain in effect. Additional requirements may include:

- Landscape irrigation restrictions shall be implemented to limit the allowable frequency of irrigation to a maximum of ONE day per week and based on the following schedule:
  1. Premises having odd numbered street addresses irrigate only on Sunday.
  2. Premises having even numbered street addresses irrigate only on Saturday.
- No potable water from the City's system shall be used to fill or refill new swimming pools, artificial lakes, ponds, or streams until the water crisis is declared over.
- Water use for ornamental ponds and fountains is prohibited.
- Washing of automobiles and equipment shall be done on the lawn or at a commercial establishment that used recycled or reclaimed water.
- Flushing of sewers or fire hydrants is permitted only in cases of emergency and essential operations.

A permanent water meter on existing non-metered services and/or flow restrictors on existing metered services shall be installed by the City on the service at customer's expense upon receipt of the second violation.

Stage V. Water Emergency

During Stage V of a water supply shortage, the shortage is critical, a 50% or greater reduction in water usage is required for the City to meet the immediate needs of its customers.

All mandatory requirements of Stages I, II, III, and IV shall remain in effect. Additional requirements may include:

- Landscape irrigation shall not be allowed.
- Washing of automobiles and equipment shall be done at a commercial establishment that used recycled or reclaimed water.

- No potable water from the City's system shall be used for construction purposes such as dust control, compaction, or trench jetting.
- Large industrial users, for example canneries and other food manufacturers, be required to reduce or cease all water use.

SECTION 4. REDUCTION MEASURING MECHANISM

California Water Code sections 10632 (i) requires the water supplier to develop a mechanism for determining actual reductions in water use in the course of carrying out the urban water supply shortage contingency analysis.

The City of Lodi's residential customers are not metered and approximately 72 percent of non-residential customers are metered. Reductions in water use from these non-residential customers can be measured by individual water meters. Exceptionally high usage will be identified by the City, and these accounts will be investigated for potential water loss or abuse problems. Water well production figures are recorded daily. Totals are reported monthly and are incorporated into water supply reports.

During all stages of water shortages, daily production figures are reported to and monitored by the appropriate City Public Works employee. The City may elect to read non-residential customer meters on a more frequent basis.

SECTION 5. PREPARATION FOR CATASTROPHIC WATER SUPPLY INTERRUPTION

The Water Code section 10632 (c) requires actions to be undertaken by the water supplier to prepare for, and implement during a catastrophic interruption of water supplies. A catastrophic event that constitutes a proclamation of a water shortage would be any event, either natural or manmade, that causes a severe shortage of water, synonymous with or with greater severity than the Stage III or Stage IV water supply shortage conditions.

The City of Lodi maintains a sound preventative maintenance program of their distribution system. Auxiliary generators are available and improvements to water facilities are made to minimize loss of these facilities during an earthquake or any disaster causing an electric power outage.

Action items that may be pursued in preparing for and responding to a catastrophic water supply interruption could include:

- Increase existing water ~~shortage~~ storage.
- Obtain additional water supplies.
- Determine where funding for additional water supplies will come from.
- Contact and coordinate with other agencies.
- Create an Emergency Response Team/Coordinator.
- Create a catastrophe preparedness plan.
- Put employees/contractors on-call.
- Develop methods to communicate with the public.
- Develop methods to prepare for water quality interruptions.

SECTION 6. ANALYSIS OF REVENUE AND EXPENDITURE IMPACTS

Section 10632 (g) of the California Water Code requires an analysis of the impacts of each of the actions taken for conservation and water restriction on the revenues and expenditures of the water supplier. Approximately 73% of the City's water was supplied to non-metered residential and industrial/commercial customers in 1999. Because the City of Lodi charges a flat rate to all of its residential customers and unmetered non-residential customers, revenue impacts of decreasing supply and consumer use will be minimal.

The majority of the City's water customers are charged with a flat rate. A reduction in the use of water may have a corresponding reduction in the expenditures by the City for the treatment and distribution of the water supply. Any of the aforementioned reductions in expenditures could be offset by increased costs for personnel time during the emergency, notification actions, emergency equipment rental or purchase, emergency generator usage, etc.

Because no substantial financial impacts are anticipated on the revenues and expenditures of the City, no measures to overcome impacts are included.

SECTION 7. DRAFT WATER SHORTAGE CONTINGENCY RESOLUTION

Section 10632 (h) of the California Water Code requires the inclusion of a draft water shortage contingency resolution. In the event of a water shortage emergency, the following is a draft water shortage contingency resolution to be passed by the Lodi City Council. The draft below gives the City Council's support to the Public Works Director in taking emergency actions as currently authorized in Lodi Municipal Code, Chapter 13.08, Article III, Section 13.08.290, "Emergency Water Conservation".

DRAFT

City of Lodi

*Resolution No.*_____

WHEREAS, Lodi Municipal Code, Chapter 13.08, Article III, Section 13.08.290, Emergency Water Conservation allows the Public Works Director to determine the degree of emergency and determine what additional restrictions of water use or other appropriate actions must be taken to protect the water system and the citizens of Lodi; and

WHEREAS, the City of Lodi is experiencing water shortages, therefore;

BE IT RESOLVED by the City Council of the City of Lodi that full support is given to the Public Works Director to make the appropriate recommendations which may include increased restrictions on watering days and hours, restrictions on washing vehicles, etc., restrictions on large water users, restrictions on flushing of water lines, restrictions on the filling of swimming pools, and increases in the current penalties for not complying with water conservation restrictions for the duration of the emergency, and urge full support and cooperation from the citizens of Lodi.

Affix Official Seal Here

*Signature:*_____
*Name:*_____
*Title:*_____
Clerk of City of Lodi

Please immediately confirm receipt of this fax by calling 333-6702

CITY OF LODI
P. O. BOX 3006
LODI, CALIFORNIA 95241-1910

ADVERTISING INSTRUCTIONS

SUBJECT: SET A PUBLIC HEARING FOR JULY 18, 2001 TO CONSIDER ADOPTING THE UPDATE OF LODI'S URBAN WATER MANAGEMENT PLAN

PUBLISH DATE(s): **SATURDAY, JUNE 23, 2001**
and
SATURDAY, JUNE 30, 2001

TEAR SHEETS WANTED: Three (3) please

SEND AFFIDAVIT AND BILL TO:
SUSAN BLACKSTON, CITY CLERK
City of Lodi
P.O. Box 3006
Lodi, CA 95241-1910

DATED: JUNE 21, 2001

ORDERED BY:

JACQUELINE L. TAYLOR
DEPUTY CITY CLERK

JENNIFER M. PERRIN
DEPUTY CITY CLERK

Verify Appearance of this Legal in the Newspaper - Copy to File

Faxed to the Sentinel at 369-1084 at _____(time) on _____(date) _____(pages)
Sharon _____ Phoned to confirm receipt of all pages at _____(time) ____Jac ___Jen (initials)

CITY OF LODI

Carnegie Forum
305 West Pine Street, Lodi

NOTICE OF PUBLIC HEARING
Date: July 18, 2001
Time: 7:00 p.m.

For information regarding this notice please contact:
Susan J. Blackston
City Clerk
Telephone: (209) 333-6702

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that on **Wednesday, July 18, 2001** at the hour of 7:00 p.m., or as soon thereafter as the matter may be heard, the City Council will conduct a Public Hearing at the Carnegie Forum, 305 West Pine Street, Lodi, to consider the following matter:

a) adopting the update of Lodi's Urban Water Management Plan

A copy of the updated Urban Water Management Plan (approximately 75 pages) is available for review by the public in the Public Works Department, the City Clerk's Office and the Lodi Library.

Information regarding this item may be obtained in the office of the Public Works Department Director, 221 West Pine Street, Lodi, California. All interested persons are invited to present their views and comments on this matter. Written statements may be filed with the City Clerk at any time prior to the hearing scheduled herein, and oral statements may be made at said hearing.

If you challenge the subject matter in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing described in this notice or in written correspondence delivered to the City Clerk, 221 West Pine Street, at or prior to the Public Hearing.

By Order of the Lodi City Council:

Susan J. Blackston
City Clerk

Dated: June 20, 2001

Approved as to form:

Randall A. Hays
City Attorney

PUBLIC NOTICE

The City of Lodi is inviting statements of qualifications from design consultant firms. Projects involve street reconstruction and median installation. Interested firms please contact Public Works, (209) 333-6706, for a request for qualifications (RFQ).
June 7, 8, 9, 14, 15, 16, 21, 22, 23, 2001 — 3421

NOTICE OF TRUSTEE'S SALE

Trustee's Sale Number: 40095-F CA Loan #: 40100143 TSG #: 9900551 YOU ARE IN DEFAULT UNDER A DEED OF TRUST, DATED 09/24/97. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY~ IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDING AGAINST YOU, YOU SHOULD CONTACT A LAWYER. On 06/29/01, at 10:00 AM, Attorneys Equity National Corporation (Trustee), 23721 Birtcher Drive, Lake Forest, CA 92630, as the duly appointed Trustee under and pursuant to Deed of Trust recorded 10/02/97 as Document 97098766 of Official Records in the office of the Recorder of San Joaquin County, California. Executed by: Maria E. Perez, an unmarried woman, will sell at public auction to highest bidder for cash or cashiers check made payable to Attorneys Equity National Corporation, (payable at time of sale and in accordance with Section 2924h(b) of the California Civil Code, and acceptable to the Trustee) at: At the East Weber Avenue entrance to the County Courthouse, 222 East Weber Avenue Stockton, California all right, title and interest conveyed to and now held by it under said Deed of Trust in the property situated in said County, California. The street address or other common designation, if any, of the real property described herein is purported to be: 916 Calaveras Street & 402 Stanislaus Street, Lodi, CA 95240; County Assessor's Parcel Number: 041-360-26 & 041-360-27 The undersigned Trustee disclaims any liability for any incorrectness of the street address and other common designation, if any, shown herein. Said sale will be made, but without covenant or warranty, expressed or implied, regarding title, possession, or encumbrances, to pay the unpaid balance of the obligation, including interest, advances, and all other charges secured by said property. The total amount of the unpaid balance of the obligation secured by said property and reasonably estimated costs, expenses and advances at the time of the initial publication of this Notice is $173,409.96. Date: 06/05/01 Attorneys Equity National Corporation, 23721 Birtcher Drive, Lake Forest, CA 92630, Phone (949) 707-5543, Sale Information (949) 707-5640, Dania Trevino, Foreclosure Department ASAP#34598
June 8, 15, 22, 2001 — 3431

PUBLIC NOTICE

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that on **Wednesday, July 18, 2001** at the hour of 7:00 p.m., or as soon thereafter as the matter may be heard, the City Council will conduct a Public Hearing at the Carnegie Forum, 305 West Pine Street, Lodi, to consider the following matter:
a) adopting the update of Lodi's Urban Water Management Plan
A copy of the updated Urban Water Management Plan (approximately 75 pages) is available for review by the public in the Public Works Department, the City Clerk's Office and the Lodi Library.
Information regarding this item may be obtained in the office of the Public Works Department Director, 221 West Pine Street, Lodi, California.
All interested persons are invited to present their views and comments on this matter. Written statements may be filed with the City Clerk at any time prior to the hearing scheduled herein, and oral statements may be made at said hearing.
If you challenge the subject matter in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing described in this notice or in written correspondence delivered to the City Clerk, 221 West Pine Street, at or prior to the Public Hearing.
By Order of the Lodi City Council:
Susan J. Blackston
City Clerk
Dated: June 20, 2001
Approved as to form:
Randall A. Hays
City Attorney
June 23, 30, 2001 — 3475

NOTICE INVITING BIDS

White Slough Water Pollution Control Facility
ADJUSTABLE FREQUENCY DRIVES
SECTION 1
CITY OF LODI, CALIFORNIA
The City of Lodi hereby invites sealed proposals to furnish and deliver three (3) 75 horsepower and one (1) 50 horsepower, three phase Adjustable Frequency Drives (AFD) in accordance with the specifications detailed in section 4, table 4.10, AFD reference B & C. Delivery shall be to the City of Lodi's White Slough Water Pollution Control Facility, Lodi, California. Proposals shall be in accordance with this notice and specifications on file and available from the City of Lodi, Public Works Department, Municipal Service Center, 1331 South Ham Lane, Lodi, CA 95242, (209) 333-6740. No bid will be considered unless it is submitted on a proposal form furnished by the City of Lodi.
Sealed proposals shall be delivered to the Purchasing Officer at the City Hall Annex, 212 West Pine Street, Lodi, CA 95240 (P.O. Box 3006, Lodi, CA 95241-1910) at or before
11:00 a.m., Tuesday , July 10, 2001
At that date and hour said sealed proposals will be publicly opened and read in the Public Works Conference Room, First Floor, City Hall, 221 West Pine Street, Lodi, California. Bidders or their authorized representatives are invited to be present.
The City of Lodi reserves the right to reject any or all bids, to waive any informality in any bid, to accept other than the lowest bid, or not to award the bid.
Reference is hereby made to said specifications for further details, which specifications and this notice shall be considered part of any contract made pursuant thereto.
CITY OF LODI
Joel E. Harris
Purchasing Officer
June 23, June 28, 2001 —3473

NOTICE INVITING BIDS

SECTION 1
TYPE 11 POLYMER MODIFIED SLURRY SEAL
VARIOUS STREETS, 2001
CITY OF LODI, CALIFORNIA
The City of Lodi hereby invites sealed proposal for the application of 1,209,995 square feet of Type 11 Polymer Modified Slurry Seal to various City streets and other incidental and related work as shown in the specifications on file and available from the City of Lodi, Public Works Department, Municipal Service Center, 1331 South Ham Lane, Lodi, CA 95242, (209) 333-6740. No bid will be considered unless it is submitted on a proposal form provided by the City of Lodi.
Sealed proposals will be received by the Purchasing officer, Lodi City Hall Annex, 212 West Pine Street, P.O. Box 3006, Lodi, California, 95241-1910, until
11:00 a.m. on Thursday, July 5, 2001.
At that time the proposals will be publicly opened and read in Lodi City Hall Public Works Conference Room for performing the following described work.
The work consists of applying 1,209,995 square feet of Type 11 Polymer Modified Slurry Seal to various City streets and other incidental and related work, as shown on the specifications for the above project. The streets to be slurry sealed are shown in the Specifications.
The contractor agrees to commence work within

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Trucks/SUV's 251
Sale or Lease

CHEVROLET VAN '95
4.3 Liter HO engine, auto, 7/8 passenger, front & rear AC, PS, DL, PW, tilt, CR, AM/FM cassette, roof racks, tint, run bds. dutch doors, alloy wheels, 56 K miles. Perfect condition. Kelly book $9,500. 478-8230

CHEVY 1/2 TON PU '92
Power everything. V8, lowered, flows, stereo, wheels, tires, Sprayon bed liner, custom grill. $10,500 OBO (209) 368-5505

Trucks/SUV's 251
Sale or Lease

CHEVY TAHOE '98
4 door, 2 wheel drive, 41 K miles, extended warranty, premium wheels. Excellent condition. $25,750. 369-8608

CHEVY TAHOE '98
Copper. 4 wheel drive, 2 door, fully loaded, flow masters, tow package. $26,000. 369-5894

CHEVY TAHOE LT '99
4 wheel drive, fully loaded, leather, tow pack, custom whls, lifted,100K mile warran- [illegible]

Trucks/SUV's 251
Sale or Lease

FORD F150 4 X 4 '76
20K original miles, P/S, P/B, AC, A/T. In good shape. $7,500. 209-786-3351

FORD F150 '94 XLT
Extended cab. Fully loaded. Must see. $9,000 OBO 369-1130 eves & weekends 466-0181, Larry, weekdays.

FORD F150 '98
Extended cab. 3 door. 4X4. XLT. 76 K miles. Beautuiful white. $15,950 Call 333-1939

Trucks/SUV's 251
Sale or Lease

NISSAN FRONTIER '98
41K miles. AC. AM/FM Cassette, camper shell, bedliner. Exc. condition. $9500 obo. 333-0560

SUZUKI SAMURAI, 86. 5 speed with 4x4. Lots of new parts. No tags expired in April Runs good. $1200 Call 209-333-0559

TOYOTA '91 4 RUNNER
V6, 5 Speed. Loaded 90K orig. miles. Sunroof. CD. Excellent condition. $8,750. 368-4347